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DEPARTMENT OF THE ENVIRONMENT
CITY AND COUNTY OF SAN FRANCISCO
FRANCESCA VIETOR, DIRECTOR

Integrated Pest Management Program
Annual Report, 1999/2000
Debbie Raphael, Pesticide Program Coordinator

DOCUMENTS DEPT.

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PROGRAM ASSESSMENT

The past fiscal year has seen significant changes in the City of San Francisco's landmark Integrated Pest Management (IPM) Program. Prior to the 99/00 fiscal year, the responsibility for the implementation of the IPM program was divided between the Ag. Commissioner's office and the Department of the Environment (DEnv). On August 1, 1999 the DEnv hired a Pesticide Program Coordinator to consolidate the program and provide needed direction to coordinate the efforts of the various departments working toward the common goal of pesticide reduction.

San Francisco's IPM program is based on a solid foundation. Many staff have demonstrated a commitment to try new techniques and have developed an increased awareness around the use of chemical pesticides on city property. During the past fiscal year pesticide use has continued to fall, staff across the City have received training, an Approved List of reduced risk pesticides was developed, and many surrounding jurisdictions and school districts have looked to our program as a model for their own efforts.

Below is a summary of the state of San Francisco's IPM program. The seven departments called out in this report are those previously identified as the City's "big users" of pesticides. This designation was a result of the amount of landscaped areas or buildings falling under their responsibility. The seven "big users" are SF International Airport, Recreation and Parks, Public Works, Port, Public Utilities Commission, Public Health, and MUNI.

Ordinance Revisions

Careful review of the IPM ordinance along with discussions among members of the Technical Advisory Committee (TAC) revealed several areas where changes to the ordinance language would clarify roles and facilitate implementation of the IPM

program. DEnv staff worked closely with the City Attorney's office and aides to Supervisor Katz to draft revisions for the ordinance. The resulting revisions include:

- Anti-microbials (language prepared before my arrival)
- Notification and posting
- Role of Commission on the Environment (COE) as over-sight body
- Emergency exemptions
- Reporting frequency and content

The revised ordinance language was adopted by the County Board of Supervisors and went into effect February 14, 2000. The most recent copy of the IPM Ordinance is included as Attachment A.

Approved List

Under the terms of the IPM Ordinance a list of "reduced risk" pesticides must be completed by January 1, 2000 and must be approved by the Commission on the Environment. Only pesticides on this list may be used on City property unless an exemption has been granted by the DEnv.

An extensive process was implemented involving community members, City staff, IPM experts, the Commission on the Environment, and the technical evaluation skills of Dr. Philip Dickey of the Washington Toxics Coalition. A complete summary of this process is contained in the IPM Program Report – Reduced Risk Pesticide List 2000, included as Attachment B.

The reduced risk pesticide list is meant to be a dynamic document and will be reviewed on an on-going basis to incorporate new pesticide products and to remove un-needed ones. Any changes to the list will be brought before the Commission on the Environment for approval. The most recent list of approved reduced risk pesticides is included as Attachment C.

Data Collection and Analysis

A clear understanding of how much and what types of chemical pesticides are used on City property is a key element in the evaluation of the success of this IPM Program. A database was developed to track pesticide use but until recently no data had actually been entered into the system. Staff have been working with the contributing departments to fill in the data gaps and address inconsistencies.

Entry of pesticide use data for the Recreation and Parks Department (Rec/Parks), the department with the biggest pesticide use is complete and a summary of use trends is included as Attachment D to this report.

One important measure of the success of an IPM program is the frequency with which pest problems can be resolved without the use of any chemical controls. Data supplied

by the City-wide pest control contractor shows a dramatic increase in the number of service calls that did not require application of a pesticide. See Attachment E.

DEnv staff are working with ISD to update and redesign the city's current pesticide database system to track non-chemical methods of pest control such as prevention efforts and trapping. Adding this type of information will transform the database into a more accurate reflection of an IPM program.

Pesticide Inventory and Disposal

While the most toxic and hazardous pesticides have been eliminated from use on City property, containers of these pesticides still existed on City storeroom shelves. DEnv staff worked with City departments to survey storage facilities and identify pesticide products no longer allowed under the IPM program and then facilitated the timely and legal disposal of these products. The most significant area of concern was the storeroom of the Department of Recreation and Parks (DRP) in Golden Gate Park. DRP staff segregated the non-compliant products and have arranged for their removal.

The departmental IPM Coordinators from each of the seven "big user" departments have been notified about this issue and were asked to complete pesticide inventories at each of their sites to ensure that all noncompliant pesticides are removed from their property.

Contract Development

All in-door (structural) pest control is performed by outside contractors except in the DRP. The pest control bid is up for renewal in the upcoming fiscal year. This affords us the perfect opportunity to address shortcomings in the prior contract language and selection process.

DEnv staff have been meeting regularly with Purchasing staff to craft a selection process that rewards excellent IPM services rather than simply low bid. Purchasing staff have suggested using a Request for Proposal (RFP) process where price will be one of several qualifying factors. Experience in IPM implementation will be weighted heavily as well as the capacity to supply DEnv with up to date pesticide use data for each site.

Representatives from departments such as Public Works, Public Health, MUNI, Airport, Police and Fire will be brought into the contract language development process as well as the selection process. DEnv staff are working closely with Purchasing and an independent IPM expert to come up with the draft of the RFP language.

Training/Conferences

One key component of all IPM programs is the importance of on-going training for city staff at all levels. DEnv staff have been working with City departments to organize and

coordinate a variety of training opportunities. All training events and conferences are free of charge to participating departments and are funded from the DEnv IPM budget.

TAC Meetings: Each month representatives from the seven “big user” departments meet to discuss implementation of the IPM program. Participants include departmental IPM Coordinators, safety and environmental compliance staff, pest control contractors, independent IPM experts, and community members. The Pesticide Program Coordinator from DEnv chairs these meetings and sets the agendas.

Topics have included guest speakers on pesticide regulations, new products and techniques, changes to the IPM Ordinance, training planning, and pesticide reporting requirements. Most importantly, these meetings offer opportunities for departments to share experiences around pest control so that others can learn from their mistakes and successes. For example, the airport has reported on their monitoring and feedback system, and PUC presented the weed control manuals developed for them by Sheila Daar, IPM expert – copies were handed out to all TAC members, and Public Health discussed their Communications Audit.

IPM Conference: This annual event was held on April 4th. Traditionally conference attendees have been primarily City staff but with the widespread regional interest in IPM programs, many surrounding jurisdictions and school districts sent representatives. Participants came from Los Angeles, Santa Barbara, Santa Clara, Alameda, Marin, and Sonoma counties. Speakers were invited from universities in Oregon and Southern California. The San Francisco Bay Area is lucky to have a large pool of IPM expertise and many of these professionals led sessions at the conference. The conference is free to all participants. About 125 people were in attendance.

The agenda for the conference was based on input from members of the TAC Committee as well as suggestions from IPM Professionals. Topics included:

- Use of Compost Tea to replace fungicides
- Biology and control of Argentine Ants
- Use of mulches and soils analysis to prevent weeds
- Mechanical means of vertebrate control
- Dealing with “phantom” pests

Mayor Brown presented several City departments and individual staff members with Environmental Service Awards in recognition of their efforts to reduce the use of pesticides on City property. Recipients for the year 2000 were:

- Department of Public Health – gardeners at SF General Hospital
- Public Utilities Commission – Milbrea team for watershed management
- MUNI – Pesticide reduction in “rolling stock” (buses, trains, trolleys)
- Department of Recreation and Parks – Efforts of Bob Fiorello

Site Specific Workshops and Training: Several departments offer pesticide safety training to their staff who serve as pesticide applicators. DEnv staff work closely with the departments to bring in outside experts as speakers and to arrange for professional credit issued by the Department of Pesticide Regulation.

Training sessions held to date have serviced the following departments:

Rec/Parks: 140 participants
PUC: 60 participants
Airport: 20 participants
Public Health: 100 participants

DEnv will work with the Port and Department of Public Works, and MUNI to identify training needs and opportunities.

Community and Regional Outreach

Web Site – The IPM Program's IPM Web Site is now up and running. The site can be accessed through the City's Web Page as well as through the DEnv web site at sfenvironment.com. The goal of the IPM Web Site is to allow easy access to documents produced by the program and to serve as a hub from which people can gain access to a wide array of pest-related information.

Eventually, DEnv staff would like to see pesticide use information accessible to residents from this web site. For example, a parent would be able to determine if any pesticides had been applied to their neighborhood park. ISD staff have discussed converting the current database to an Internet version but the undertaking is not trivial and will require a significant financial commitment of the IPM Program's budget.

Interdepartmental Coordination – Several other City departments implement efforts that share common themes with the IPM Program. For example, the PUC is crafting an outreach program aimed at pest control contractors to try to prevent pesticide run off into the City's storm drains and sewer system. The Water Conservation Program addresses water and pesticide use for landscape professionals. The Pesticide Partnership is another PUC driven program but is aimed at the resident by placing in-store information on less toxic pest control at selected retail outlets. The PUC also works with San Francisco League of Urban Gardeners to train master gardeners. The Natural Areas Program out of the DRP trains volunteers to remove non-native plants to avoid the need for chemical controls.

In order to coordinate all these efforts, to reduce overlap, and to facilitate partnerships between departments DEnv Staff have created the San Francisco Pesticide Working Group. This group has met once and will be meeting on a regular basis to share information and plan interdepartmental projects. One such project may be the sponsorship of a teacher training summer IPM workshop that will encourage the creation of gardens as part of the City's after school program at local parks while learning about non-chemical pest control methods.

Community Events – The IPM Program sponsored and staffed a booth at the San Francisco Flower and Garden Show in March. The booth highlighted alternative pest control strategies. Approximately **3,000 visitors** were reached at our booth. Additional opportunities for community outreach will be explored especially through the SF Pesticide Working Group.

Written Materials - This area is becoming increasingly important as San Francisco's IPM program matures. Currently there is a real dearth of accurate and timely information about our IPM program. DEnv Staff have updated some of the summary materials found in the Implementation Notebook and need to look at the document in its entirety.

In addition, DEnv Staff along with Gregg Small of Pesticide Watch wrote an article published in the Journal of Pesticide Reform (see Attachment F). The journal has a national distribution and the article summarizes San Francisco's program accomplishments and challenges over the past three years.

Presentations and Partnerships - The Pesticide Program Coordinator has been invited to speak about San Francisco's IPM Program within the City at community groups and PUC seminars, and at the Annual Urban IPM Conference at the University of California, Riverside. Interest in the San Francisco program crosses the nation and limitations of staff time and resources restrict the DEnv's ability to meet all the requests for conference participation.

San Francisco is serving as a model for jurisdictions and school districts across the country. DEnv Staff have been working to help draft IPM legislation and develop workable programs in the Counties of Marin and Santa Clara, the City of Oakland, and school districts in San Francisco, Marin, Oakland, and San Leandro. In addition, San Francisco IPM staff have been asked to advise the Federal Environmental Protection Agency Region 9 about implementing a national school IPM program. The City of Santa Fe, New Mexico is also using San Francisco as a template for local IPM efforts.

Departmental Needs

While all City departments are covered by the IPM Ordinance and are mandated to have Pest Management Plans on file with the DEnv, the focus of staff efforts have been on the compliance of the "big seven" departments. Pest control for all other City departments is performed only by outside contractors. The Contract Development section of this report outlines the changes and improvements planned for working with outside contractors.

MUNI – Compliance with structural use of pesticides is excellent and the "rolling stock" (buses, trains, cable cars, etc) are a model of IPM methods that should be published and broadcast to transportation agencies throughout the country. The landscape division needs to make improvements on notification/posting. Site managers and station agents

complained about mice and were distributed fact sheets on pest prevention strategies. In addition, carpenters were brought in to pest-proof problem areas. Currently MUNI is the only "big user" department to be without a departmental IPM plan. DEnv staff have met with the appropriate staff in the ISLPP department of MUNI and will aid them in the development of an IPM plan.

Airport – The San Francisco International Airport has an excellent IPM program both within buildings and in landscaped areas. A well-defined chain of command results in timely structural repairs and hence an effective pest prevention program. A pest management plan is on file with DEnv and Airport Staff conduct annual safety training that includes IPM principles.

While City maintained property is fully compliant with the IPM Ordinance the many tenants at the Airport are not. The ordinance requires only that these entities become compliant upon renewal of their lease agreements. Because of the long-term nature of most leases, DEnv staff will need to explore voluntary participation by Airport tenants in the IPM Program.

One area of future concern is the challenge of maintaining the additional landscaped areas resulting from the airport's expansion. Herbicide use on Airport property may show a marked increase if weed prevention methods are not incorporated into landscape designs.

Port – Like the Airport, property maintained by the San Francisco Port is in full compliance with the requirements of the IPM Ordinance. One area that presented a problem was in reporting of landscape pesticide use to the DEnv. Port landscape staff were not given a computer until very recently. Port staff should be submitting electronic use reports on a monthly basis, as required under the ordinance

Again, many properties that are administered by the Port are not maintained by City staff. The Port has an extensive leasing department and DEnv staff are working with this group to ensure inclusion of IPM language into all new leases. A follow-up or enforcement plan will need to be developed for these and other similar city-owned properties that are privately maintained.

One barrier to further decreases in the use of chemical herbicides on Port property is the small number of landscape staff – a single position has been allocated. While the Port's landscape gardener has done an excellent job of identifying priority areas for herbicide use, the Port could be a good model for effective use of additional resources to achieve greater pesticide reductions.

Public Works – An IPM plan is currently on file with DEnv and DPW's Safety staff are well informed as to program goals and requirements. The Public Works Department has an excellent compliance record in both its buildings and landscape areas but the current vacancy in the position of landscape IPM Coordinator may jeopardize this model

performance. Before the staffing vacancy, DPW was recognized for its weed prevention programs on median strips throughout the city by using both mulches and the planting of wild flowers. These efforts not only resulted in a decreased dependence on pesticides, but also greatly enhanced the aesthetics of public right of ways. DEnv is very concerned by the slow pace of filling this key IPM position.

PUC – This department should serve as a model for IPM implementation not only within our City but also across the country. The PUC received a Commendation from the Board of Supervisors for its leadership role in tracking pesticide use, identifying opportunities for reduction, and training of departmental staff. The PUC has allocated resources to purchase equipment and experiment with new technologies to achieve their goals of brush management, soil conservation, and water quality protection. It is interesting to note that while PUC staff might not label their efforts IPM, these goals are all shared in common with a successful IPM program.

There is currently some shifting of responsibilities for the overall departmental IPM program responsibility due to the transfer of a key staff person to the Water Treatment and Supply division. DEnv staff will continue to work with all the divisions of the PUC to make sure program oversight is not compromised.

Public Health – Key safety staff of the two hospitals, the clinics, and other Public Health properties are well on board with the IPM program. Landscape staff at San Francisco General Hospital use no pesticides to maintain their beautiful grounds. Laguna Honda Hospital has developed a well-defined chain of command that can quickly respond to any pest emergency and implement needed sanitation changes or structural repairs.

A model IPM plan has been completed and several training sessions for custodial, maintenance and nursing staff took place in the spring. Achieving the high standard for pest control necessary in patient care facilities has been a challenge for the IPM program. Public Health staff have proven to be willing participants and are improving lines of communication between pest control contract staff and their own maintenance staff to facilitate the pest proofing repairs critical to program success.

Problems with existing contract language for pest control services will be addressed in the upcoming contract review process. DEnv staff have been working closely with staff from Public Health to ensure a smooth transition to a new pest control contract.

Rec/Parks – The Department of Recreation and Parks (DRP) is the most complex of all city departments affected by the IPM ordinance. DRP has realigned staff positions to create an IPM team of one coordinator and three specialists. This team is charged with both education and enforcement of the ordinance requirements. DEnv staff have been working closely with this department to facilitate reporting, coordinate training, and identify new pest control techniques consistent with an IPM program.

DRP is the only city department to do structural pest control in-house. The three IPM specialists do structural pest control services for all DRP buildings (except for the Pools).

Compliance with the ordinance is excellent but the lack of a quality assurance program for structural pest control raises concerns over the effectiveness of their pest control measures.

Results of DRP pesticide use reports:

The increase in the pounds of pesticides used from 1998 to 1999 can be explained by the introduction, on a trial basis, of the reduced risk herbicide, Suppressa. Suppressa is a relatively new product made from corn gluten meal - a food grade substance that in large enough concentrations seems to suppress weed growth and germination.

While the numbers indicate a general decrease in the amount of pesticide used on City property and most of the products with the greatest human health and environmental impacts have been eliminated, there remains a need to examine the Department's decision making process and potential barriers to further implementation of non-chemical pest control methods. DEnv staff can not do this analysis alone. Rec/Parks staff must carefully look at each pesticide use decision and identify trends that explain use patterns. Rec/Parks staff must specify where additional resources would result in the most significant decreases in pesticide use.

A new IPM Coordinator for DRP will be starting in the coming fiscal year. This position is critical to the success of the Department's IPM efforts. The individual must be given the authority to regulate pesticide use and must have the support of the DRP administration to deny requests for pesticide applications.

Future Directions

Newsletter – Several members of the TAC have requested the creation of a citywide newsletter that publicizes the IPM program to city employees. Perhaps the IPM program could piggy-back on the efforts of the Department of Consumer Assurance (formerly County Agricultural Commissioner's Office) who plans on starting a newsletter or could insert articles on IPM into a broader environmental newsletter coming out of the Department of the Environment. Newsletters can become an excellent channel for communicating specific pest control techniques that can be used by staff both at work and at home. It would also serve to highlight the efforts of some of our local IPM "hero's".

Advisory Committee – Except for the on-going involvement of Pesticide Watch, there seems to be no formal or regular process for public input into the IPM Program. Considering the very public nature of this program's conception, the lack of public input could be seen as a significant oversight. DEnv staff, along with the Director of the Department will explore the creation of a more formalized public input process, perhaps an advisory committee. Experience with the ad-hoc committee for the Approved List indicates both the level of public interest in this idea as well as the potential for constructive contributions.

Public Notification - There is a need to tighten up record keeping at individual sites so that site managers can document pest infestations and will have a record of all pest control measures currently in use within their building. With the start of a new pest control contract, emphasis will be given on pest control notebooks being placed in each city building. These notebooks would contain pest sighting logs, records of pest control measures, and labels and material safety data sheets for each pesticide used within a building.

Sec. <u>39.1.</u>	Purpose and Findings.	February 14, 2000	Attachment A
Sec. <u>39.2.</u>	Definitions.		
Sec. <u>39.3.</u>	Ban on Use of Toxicity Category I and Certain Other Pesticides.		
Sec. <u>39.4.</u>	Ban on Use of Toxicity Category II Pesticide Products; Total Pesticide Ban.		
Sec. <u>39.5.</u>	Notice of Pesticide Use.		
Sec. <u>39.6.</u>	Implementation of City Integrated Pest Management Policy.		
Sec. <u>39.7.</u>	Recordkeeping and Reporting.		
Sec. <u>39.8.</u>	Exemptions.		
Sec. <u>39.9.</u>	City Contracts.		
Sec. <u>39.10.</u>	Guidelines.		

SEC. 39.1. PURPOSE AND FINDINGS.

(a) The Board of Supervisors hereby finds and declares that it shall be the policy of the City and County of San Francisco for City departments and City contractors who apply pesticides to City property to eliminate or reduce pesticide applications on City property to the maximum extent feasible.

(b) Under this Chapter, the City and County of San Francisco wishes to exercise its power to make economic decisions involving its own funds as a participant in the marketplace and to conduct its own business as a municipal corporation to ensure that purchases and expenditures of public monies are made in a manner consistent with integrated pest management policies and practices.

(c) This Chapter 39 concerns the application of pesticides to property owned by the City and County of San Francisco only, and does not concern the application of pesticides to property that is not owned by the City and County of San Francisco.

(d) City departments shall implement the following City Integrated Pest Management (IPM) Policy:

CITY INTEGRATED PEST MANAGEMENT POLICY

The City, in carrying out its operations, shall assume pesticides are potentially hazardous to human and environmental health. City departments shall give preference to reasonably available nonpesticide alternatives when considering the use of pesticides on City property. For all pest problems on City property, City departments shall follow the integrated pest management (IPM) approach outlined below.

(1) Monitor each pest ecosystem to determine pest population, size, occurrence, and natural enemy population, if present. Identify decisions and practices that could affect pest populations. Keep records of such monitoring;

(2) Set for each pest at each site and identify in an IPM implementation plan, an injury level, based on how much biological, aesthetic or economic damage the site can tolerate;

(3) Consider a range of potential treatments for the pest problem. Employ nonpesticide management tactics first. Consider the use of chemicals only as a last resort and select and use chemicals only within an IPM program and in accordance with the provisions of Chapter 39.

(A) Determine the most effective treatment time, based on pest biology and other variables, such as weather, seasonal changes in wildlife use and local conditions,

(B) Design and construct indoor and outdoor areas to reduce and eliminate pest habitats,

(C) Modify management practices, including watering, mulching, waste management, and food

storage,

- (D) Modify pest ecosystems to reduce food and living space,
- (E) Use physical controls such as hand-weeding, traps and barriers,
- (F) Use biological controls (introducing or enhancing pests' natural enemies);
- (4) Conduct ongoing educational programs:
- (A) Acquaint staff with pest biologies, the IPM approach, new pest management strategies as they become known, and toxicology of pesticides proposed for use,
- (B) Inform the public of the City's attempt to reduce pesticide use and respond to questions from the public about the City's pest management practices;
- (5) Monitor treatment to evaluate effectiveness. Keep monitoring records and include them in the IPM implementation plan.
- (e) Nothing in this Chapter is intended to apply to pesticide applications that are required to comply with federal, State or local laws or regulations. (Added by Ord. 401-96, App. 10/21/96; amended Ord. 274-97, App. 7/3/97)

SEC. 39.2. DEFINITIONS.

Whenever used in this Chapter, the following terms shall have the meanings set forth below.

- (a) "City department" means any department of the City and County of San Francisco and includes any pesticide applicator hired by a City department to apply pesticides on City property. City department does not include any other local agency or any federal or State agency, including but not limited to the San Francisco School District, the San Francisco Community College District, the San Francisco Redevelopment Agency and the San Francisco Housing Authority.
- (b) "Commission" means the Commission on the Environment provided for by San Francisco Charter Section 4.118.
- (c) "Contract" means a binding written agreement, including but not limited to a contract, lease, permit, license or easement between a person, firm, corporation or other entity, including a governmental entity, and a City department, which grants a right to use or occupy property of the City and County of San Francisco for a specified purpose or purposes.
- (d) "Contractor" means a person, firm, corporation or other entity, including a governmental entity, that enters into a contract with a City department.
- (e) "Department" means the Department of the Environment provided for by San Francisco Charter Section 4.118.
- (f) "Integrated pest management" means a decision-making process for managing pests that uses monitoring to determine pest injury levels and combines biological, cultural, physical, and chemical tools to minimize health, environmental and financial risks. The method uses extensive knowledge about pests, such as infestation thresholds, life histories, environmental requirements and natural enemies to complement and facilitate biological and other natural control of pests. The method uses the least toxic synthetic pesticides only as a last resort to controlling pests.
- (g) "Pesticide" means pesticide as defined in Section 12753 of Chapter 2 of Division 7 of the California Food and Agricultural Code, but does not include antimicrobial agents as defined by Section 21F.2(a) of the Administrative Code.
- (h) "Toxicity Category I Pesticide Product" means any pesticide product that meets United States Environmental Protection Agency criteria for Toxicity Category I under Section 156.10 of Part 156 of Title 40 of the Code of Federal Regulations.
- (i) "Toxicity Category II Pesticide Product" means any pesticide product that meets United States Environmental Protection Agency criteria for Toxicity Category II under Section 156.10 of Part 156 of Title 40 of the Code of Federal Regulations. (Added by Ord. 401-96, App. 10/21/96; amended Ord. 274-97, App. 7/3/97; Ord. 361-98, App. 12/11/98; Ord. 2-00, File No. 992000, App. 1/13/2000)

SEC. 39.3. BAN ON USE OF TOXICITY CATEGORY I AND CERTAIN OTHER PESTICIDES.

Except for pesticides granted an exemption pursuant to Section 39.8, effective January 1, 1997, no City department shall use any Toxicity Category I Pesticide Product, any pesticide containing a chemical identified by the State of California as a chemical known to the State to cause cancer or reproductive toxicity pursuant to the California Safe Drinking Water and Toxic Enforcement Act of 1986, and any pesticide classified as a human carcinogen, probable human carcinogen or possible human carcinogen by the United States Environmental Protection Agency, Office of Prevention, Pesticides and Toxic Substances. (Added by Ord. 401-96, App. 10/21/96; amended Ord. 274-97, App. 7/3/97)

SEC. 39.4. BAN ON USE OF TOXICITY CATEGORY II PESTICIDE PRODUCTS; TOTAL PESTICIDE BAN.

(a) Except for pesticides granted an exemption pursuant to Section 39.8, effective January 1, 1998, no City department shall use any Toxicity Category II Pesticide Product.

(b) Except for pesticides granted an exemption pursuant to Section 39.8, by January 1, 2000, any City department that uses one or more pesticides not banned under Section 39.3 or Section 39.4(a), shall reduce by 100 percent the cumulative volume of such pesticides that it used in calendar year 1996. (Added by Ord. 401-96, App. 10/21/96; amended Ord. 274-97, App. 7/3/97)

SEC. 39.5. NOTICE OF PESTICIDE USE.

(a) Except as provided in Subdivisions (b) through (e) hereof, within 120 days of the effective date of this ordinance, any City department that uses any pesticide shall comply with the following notification procedures:

(1) Signs shall be posted at least three days before application of the pesticide product and remain posted at least four days after application of the pesticide.

(2) Signs shall be posted (i) at every entry point where the pesticide is applied if the pesticide is applied in an enclosed area, and (ii) in highly visible locations around the perimeter of the area where the pesticide is applied if the pesticide is applied in an open area.

(3) Signs shall be of a standardized design that are easily recognizable to the public and workers.

(4) Signs shall contain the name and active ingredient of the pesticide product, the target pest, the date of pesticide use, the signal word indicating the toxicity category of the pesticide product, the date for re-entry to the area treated, and the name and contact number for the City department responsible for the application.

(b) City departments shall not be required to post signs in accordance with Subsection (a) in right-of-way locations that the general public does not use for recreational purposes. However, each City department that uses pesticides in such right-of-way locations shall develop and maintain a public access telephone number about pesticide applications in the right-of-way areas. Information readily available by calling the public access number shall include for any pesticide that will be applied within the next three days or has been applied within the last four days: A description of the area of the pesticide application, the name and active ingredient of the pesticide product, the target pest, the date of pesticide use, the signal word indicating the toxicity category of the pesticide product, the re-entry period of the area treated and the name and contact number for the City department responsible for the application. Information about the public access telephone number shall be posted in a public location at the City department's main office building.

(c) City departments using baits or other pesticides granted an exemption by the Department pursuant to Subsection (e) shall not be required to post signs in accordance with Subsection (a). However, each City department that uses pesticidal baits or other pesticides granted an exemption by the Department pursuant to Subsection (e) shall post a permanent sign: (1) in each building or vehicle where such pesticides are used, (2) at the City department's main office or a similar location where the public obtains information regarding the building or vehicle, and (3) when such pesticides are used outdoors to control rats and other pests, in a conspicuous location outside of the area where they are used. The sign shall indicate the name and active ingredient of the pesticides used in and around the building or vehicle, the target pests, the signal word indicating the toxicity category of the pesticide product, the area or areas where the pesticides are commonly placed, and the contact number for the City department responsible for the application.

(d) City departments may obtain authorization from the Department to apply a pesticide without providing a three-day advance notification in the event of a public health emergency or to comply with worker safety requirements. Signs meeting the requirements of Subsection (a)(2) through Subsection (a)(4) shall be posted at the time of application and remain posted four days following the application.

(e) The Department may grant exemptions to the notification requirements for one-time pesticide uses and may authorize permanent changes in the way City departments notify the public about pesticide use in specific circumstances, upon a finding that good cause exists to allow an exemption to the notification requirements. Prior to granting an exemption pursuant to this subsection, the City department requesting the exemption shall identify the specific situations in which it is not possible to comply with the notification requirements and propose alternative notification procedures. The Department shall review and approve the alternative notification procedures. (Added by Ord. 401-96, App. 10/21/96; amended Ord. 274-97, App. 7/3/97; Ord. 231-99, File No. 991246, App. 8/20/99; Ord. 2-00, File No. 992000, App. 1/13/2000)

SEC. 39.6. IMPLEMENTATION OF CITY INTEGRATED PEST MANAGEMENT POLICY.

(a) Within 90 days of the effective date of Section 39.1(d) each City department that uses pesticides shall submit to the Department a plan for implementing the City Integrated Pest Management (IPM) Policy. The Department may require periodic IPM plan updates. The IPM implementation plans and any periodic updates shall be consistent with the requirements of this Section and any guidelines developed by the Department pursuant to this Chapter.

(b) A City department IPM implementation plan shall outline the ways in which the City department shall comply with the City IPM Policy in Section 39.1(d). The City department IPM implementation plan shall include pesticide applications performed by pesticide applicators at the request of the City department. The IPM implementation plan shall contain a list of the types and quantities of chemicals used as of December 31, 1996, the types of pest problems, the alternatives adopted to date, alternatives proposed for adoption within the next six months, and the name of the IPM Coordinator for the City department.

(c) At the request of the Department, the Commission may determine that a City department's IPM implementation plan is not in conformity with the City IPM Policy. Upon a determination of nonconformity, the City department shall submit a revised plan to the Department in accordance with a schedule established by the Commission.

(d) The Department shall assist City departments in implementing the City IPM Policy by developing public educational information about IPM plans and programs and the City's IPM Policy.

(e) The Department shall establish an IPM Policy implementation program to assist City departments in implementing the City IPM Policy. The Department shall establish a data bank of information concerning pesticide use by City departments and the efficacy of alternatives used by City departments. All City departments that use pesticides shall participate in the Department's program by:

- (1) Identifying the types of pest problems that the City Department has;
- (2) Identifying types and quantities of pesticides currently in use by the City department;
- (3) Identifying the use of alternatives for banned pesticides;
- (4) Designating City department contact personnel who are responsible for the service for which the pesticides are used to regularly assess the efficacy of alternatives and to act as a resource for other City departments; and

(5) Providing regular reports as required by the Department of the Environment on the City department's efforts to implement the City IPM Policy.

(f) The Department shall determine the cost of maintaining the IPM implementation program. The Department may request that the City departments that use pesticides provide work orders to the Department to cover the cost of maintaining the program.

(g) No later than July 1, 1997 and semi-annually thereafter, the Department shall report to the Commission on the status of City department efforts to implement the City IPM Policy. Such report shall include a summary of exemptions granted by the Department during the reporting period. The Department shall provide an annual report to the Board of Supervisors on the status of City department efforts. (Added by Ord. 401-96, App. 10/21/96; amended Ord. 274-97, App. 7/3/97; Ord. 231-99, File No. 991246, App. 8/20/99; Ord. 2-00, File No. 992000, App. 1/13/2000)

SEC. 39.7. RECORDKEEPING AND REPORTING.

(a) Each City department that uses pesticides shall keep records of all pest management activities. Each record shall include the following information:

- (1) The target pest;
- (2) The type and quantity of pesticide used;
- (3) The site of the pesticide application;
- (4) The date the pesticide was used;
- (5) The name of the pesticide applicator;
- (6) The application equipment used;
- (7) Prevention and other non-chemical methods of control used;
- (8) Experimental efforts; and
- (9) Exemptions granted by the Department pursuant to Section 39.5 or 39.8 for that application.

(b) Each City department that uses pesticides shall submit the pest management record required by Subsection (a) to the Department on a monthly basis. The Department may reduce the submittal frequency.

(c) Pest management records shall be made available to the public upon request in accordance with the provisions of the San Francisco Sunshine Ordinance, San Francisco Administrative Code, Chapter 67. (Added by Ord. 401-96, App. 10/21/96; amended Ord. 274-97, App. 7/3/97; Ord. 2-00, File No. 992000, App. 1/13/2000)

SEC. 39.8. EXEMPTIONS.

(a) **Improving and maintaining water quality.** Notwithstanding any other provision of this Chapter, this Chapter shall not apply to the use of any pesticide for the purpose of improving or maintaining water quality at:

- (1) Drinking water treatment plants;
- (2) Wastewater treatment plants;
- (3) Reservoirs; and
- (4) Related collection, distribution and treatment facilities.

(b) **One-year exemptions.** A City department may apply to the Department for up to a one-year exemption from the pesticide ban imposed by Sections 39.3 or 39.4 for use of a particular pesticide for a particular use. The application for an exemption shall be filed on a form specified by the Department and shall be signed by the City department's IPM Coordinator. The Department of the Environment may grant the one-year exemption upon a finding that the City department has:

- (1) Made a good-faith effort to find alternatives to the banned pesticide;
- (2) Demonstrated that effective, economic alternatives to the banned pesticide do not exist for the particular use; and
- (3) Developed a reasonable plan for investigating alternatives to the banned pesticide during the exemption period.

(c) **Limited use exemption.** A City department may apply to the Department for a limited use exemption for a particular pesticide banned pursuant to Section 39.3 or Section 39.4 and not covered by a one-year exemption. The application for an exemption shall be filed on a form specified by the Department and shall be signed by the City department's IPM Coordinator. The Department may grant a limited-use exemption provided that the Department finds that the City department will use the pesticide for a specific and limited purpose and for a short and defined period and the City department has identified a compelling need to use the pesticide.

(d) **Reduced-risk pesticide.** The Commission on the Environment may exempt a reduced-risk pesticide from the ban imposed by Section 39.4 upon a finding that the reduced-risk pesticide is commonly used as part of an IPM strategy. Based on recommendations by the Department, the Commission shall maintain a list of reduced-risk pesticides granted an exemption pursuant to this subsection. The Commission shall review the list annually and make necessary changes. The Commission may review and revise the list more frequently upon recommendation by the Department.

(e) **Emergency exemption.** A City department may apply to the Department for an emergency exemption in the event that an emergency pest outbreak poses an immediate threat to public health or significant economic damage will result from failure to use a pesticide banned pursuant to Section 39.3 or Section 39.4. The application for an exemption shall be filed on a form specified by the Department. The Department shall respond to the application in a timely manner. If the requesting department is unable to reach the Department, the departmental IPM Coordinator may authorize the one-time emergency use of the required pesticide. The department IPM Coordinator must notify the Department of the determination to use the pesticide by facsimile prior to its application in the event that the department IPM Coordinator is unable to reach the Department. Signs meeting the requirements of Subsection (a)(2) through Subsection (a)(4) shall be posted at the time of application and remain posted four days following the application. The Department may impose additional conditions for emergency applications. (Added by Ord. 401-96, App. 10/21/96; amended Ord. 274-97, App. 7/3/97; Ord. 361-98, App. 12/11/98; Ord. 2-00, File No. 992000, App. 1/13/2000)

SEC. 39.9. CITY CONTRACTS.

(a) As of the effective date of this Section, when a City department enters into a new contract or extends the term of an existing contract, the contract shall obligate the contractor to comply with provisions of this Section 39.9(a):

(1) Effective January 1, 1998, the contractor shall comply with Sections 39.3, 39.5 and 39.7. In addition, effective January 1, 1998, the contractor shall submit to the City department an IPM implementation plan that lists the types and estimated quantities, to the extent possible, of pesticides that the contractor may need to apply to City property during its contract, outlines actions the contractor will take to meet the City IPM Policy in Section 39.1 to the extent feasible, and identifies the primary IPM contact for the contractor.

(2) Effective January 1, 1999, the contractor shall comply with Section 39.4(a).

(3) Effective January 1, 2000, the contractor shall comply with Section 39.4(b).

(b) As of the effective date of this Section, when a City department enters into a new contract or extends the term of an existing contract that authorizes a contractor to apply pesticides to City property, the City department shall submit an IPM implementation plan update to the Commission on the Environment that incorporates the pesticide usage of the contractor into the City department's IPM implementation plan.

(c) A contractor, or City department on behalf of a contractor, may apply for any exemption authorized under Section 39.8. (Added by Ord. 274-97, App. 7/3/97)

SEC. 39.10. GUIDELINES.

The Department of the Environment may issue guidelines to assist City departments in the implementation of this Chapter. (Added by Ord. 274-97, App. 7/3/97)

City and County of San Francisco

**Integrated Pest Management
Program Report**

**Reduced Risk
Pesticide List 2000**

**Debbie Raphael
Philip Dickey
Francesca Vietor**

March 2000

Department of the Environment
City and County of San Francisco
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**1540 Market Street, Suite 160, San Francisco, California 94102
www.sfenvironment.com
Telephone (415) 554-6390 Fax 554-6393 e-mail: environment@ci.sf.ca.us**

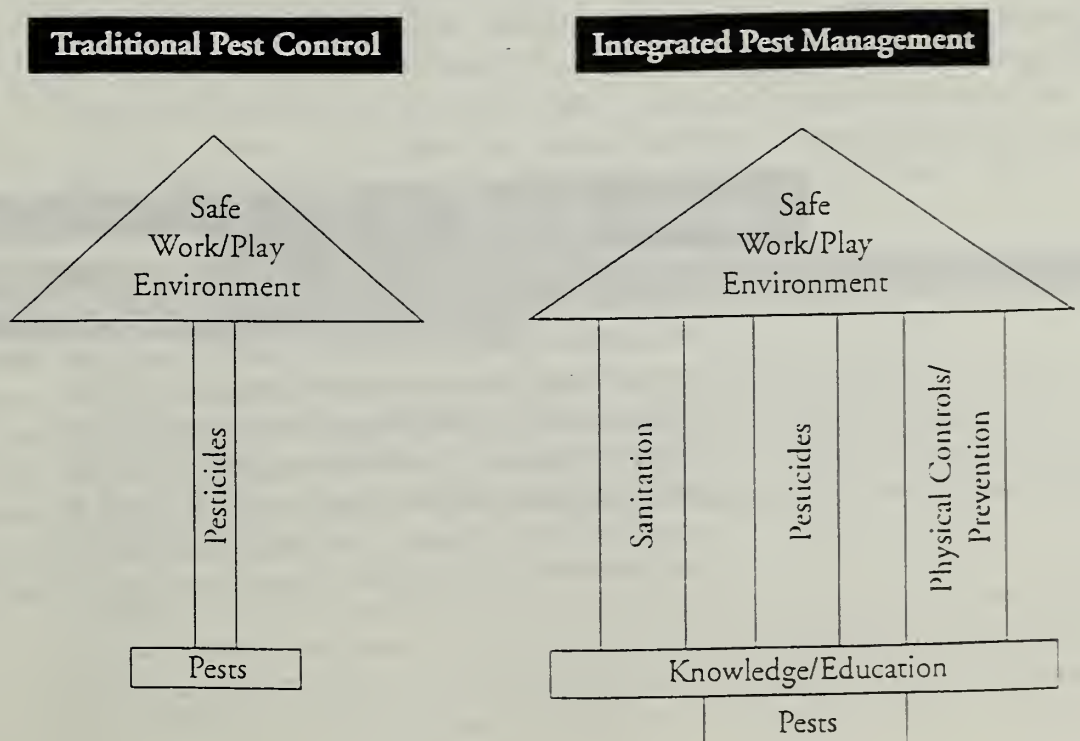
Introduction

In October 1996 the San Francisco County Board of Supervisors adopted the Integrated Pest Management (IPM) Ordinance (Chapter 39, San Francisco Municipal Code). Since that time, San Francisco has implemented an extensive education program for City staff and has adopted a wide array of pest prevention and non-chemical strategies for pest control. As a result, both the amount and the toxicity of chemical pesticides used on city/county property have been greatly reduced. The ordinance mandates the creation of a reduced-risk list of pesticides consistent with an IPM program by January 1, 2000. The following pages outline the process undertaken and the criteria used to assemble this list. San Francisco's Commission on the Environment formally adopted the list in December 1999.

Integrated Pest Management

Traditional pest control programs rely on a single strategy to manage pests - chemical pesticides. In contrast, IPM programs incorporate a number of elements to manage pest populations such as education, prevention, and sanitation (figure 1, Dr. Marc Lame, Indiana University). Chemical pesticides represent only a single element and are the measure of last resort. The adopted list of chemical pesticides represents only one part of San Francisco's comprehensive IPM program. All chemicals included in the adopted list are to be used only after programs are in place to improve sanitation, prevent pest infestation, and implement non-chemical measures. If such a pest management program proves insufficient to control a pest then the chemicals listed below may be utilized according to the restrictions specified for each pesticide product (Attachment B).

(figure 1)



In order to determine which pesticides should be included in the Reduced Risk List staff needed to develop a framework for evaluating individual pesticide products. To this end, the environmental and human health hazard (Hazard) was coupled with an analysis of how the pesticide would be used (Exposure), the availability of effective and affordable alternatives, and the level of community concern over specific active ingredients (figure 2).

(figure 2)

Reduced Risk List: Assessing Risk

HAZARD	+	EXPOSURE	=	RISK
<ul style="list-style-type: none">• Human Health<ul style="list-style-type: none">AcuteChronic• Environmental<ul style="list-style-type: none">Bio-accumulationHalf-LifeGround water contaminant• Non-Target Effects<ul style="list-style-type: none">WildlifeBeesFish		<ul style="list-style-type: none">• Degree of Application<ul style="list-style-type: none">BroadcastSpot Treatment• Mode of Application<ul style="list-style-type: none">Liquid SprayGranulesSolid or gel baits• Location<ul style="list-style-type: none">HillsideAquaticTurf areasHard surfacesIndoor		<p>Other Factors in Decision Making Process:</p> <ul style="list-style-type: none">• Availability of alternatives• Cost• Community concern

Scientific Evaluation

Dr. Philip Dickey of the Washington Toxics Coalition developed an evaluation tool to determine the relative hazard posed by pesticides submitted for consideration by city staff. Dr. Dickey analyzed the human and environmental impact of each product using criteria he developed for the City of Seattle and King County, Washington. These criteria were tailored for use in the County of San Francisco as well as for properties lying outside of San Francisco's geographic boundaries but still covered under the IPM ordinance. Dr. Dickey evaluated 111 pesticide products and grouped them according to the degree of hazard presented by each product (see Attachment A).

Ad hoc committee

An ad-hoc committee was formed to consider factors other than hazard in forming the list. The committee included City staff, a member of the Commission on the Environment, independent IPM experts, and members of the environmental community. For each of the 111 products under consideration, the committee considered the findings of Dr. Dickey along with factors such as how the product was intended for use on city property, routes of exposure, and the availability of alternatives. The sum of all these factors became the criteria for designation as a Reduced Risk pesticide (see Attachment B). The Committee met three times over several weeks in order to come to a consensus on the content of the final list.

Public meetings were held through the Commission on the Environment in November and December 1999 to explain the process and underlying assumptions used in the evaluation of pesticide products.

Product Categories: Allowed vs Limited Use

While all products on the list reflect the reduced risk evaluation process, not all are equally preferable as part of an IPM program. To address this issue, the products on the list were divided into categories of Allowed and Limited Use products. Allowed products reflect minimal concern to human health or the environment. In cases where some concern existed, specific limitations were put on the use of the product. The degree of limitation imposed reflects the level of concern. A few of the products were problematic enough to be designated as Limited use with Special Concern. The use of these Special Concern products is highly restricted and, unless no possible alternative will work, these products are targeted for removal by the end of the year.

One area of particular concern for the ad hoc committee members was the use of rodenticides to control rats, mice, squirrels, and gophers. In particular, the single feeding baits used to control rats and mice can threaten non-target species through both primary and secondary poisoning. However, committee members recognized the potentially significant health risk posed to humans if rodent populations are allowed to escalate. To mitigate non-target poisoning, a site-specific plan was developed for the control of rats and mice and is included as an attachment to the approved list (see Attachment B).

Ongoing Analysis

The list is designed to be a dynamic document. Changes will be made on an as-needed basis as new reduced risk products become available and as some of the more hazardous products are no longer needed. The Commission on the Environment will be apprised of any changes to the list and have the ultimate authority regarding the composition of the list.

The approved list along with the attached preamble and site-specific rodenticide plan are included as Attachment B. For copies of the list or more information on San Francisco's IPM Program contact Debbie Raphael, Pesticide Program Coordinator, (415) 554-6399 or debbie_raphael@ci.sf.ca.us.

Attachment A

Preliminary Evaluation of Pesticides Used by The City of San Francisco

Philip Dickey, Washington Toxics Coalition

Introduction

These notes describe the approach taken for a preliminary assessment of pesticides used by the City of San Francisco. The purpose of this assessment was to identify hazards associated with each product and to rank products based on human health and environmental criteria, as was done recently for the City of Seattle.¹ The hazard identification and product rankings were presented to the IPM Ordinance Reduced Risk Ad Hoc Committee as a basis for building lists of "allowed" and "limited use" pesticides for the city.

This initial screening is not, nor should it be, a risk assessment. Risk assessments require an enormous amount of information and analysis in order to estimate exposure and quantify risk. Risk assessments are only able to estimate risk subject to considerable uncertainties arising from incomplete toxicology data and current limitations in their ability to model the effect of exposures to many chemicals at one time. Thus, even though a risk assessment may be able to deliver a quantifiable result, there immediately arise valid questions about the precision, accuracy, and relevance of that number.

This report describes an initial cataloguing and hazard characterization. It identifies potential hazards of the products and may also characterize the degree of hazard (e.g. low, medium, or high) or the certainty of the hazard (possible, probable, or known). This hazard assessment identifies, for example, if a product contains a possible carcinogen (cancer-causing ingredient). A risk assessment would include cancer potency, estimated exposure levels, and other factors in order to estimate risk, i.e. number of cancers per million exposures. Whereas a risk assessment seeks to determine the likelihood of a given set of outcomes in a particular population, a hazard assessment can help decide if a chemical is appropriate for use under a given set of criteria. It is possible to decide as a matter of principle not to use any products containing known or probable carcinogens without seeking to determine exactly how many cancers might occur as a result of continuing to use the products.

It is understood that the Ad Hoc Committee will consider how the products are used and that for certain products such as enclosed bait stations where exposure is minimal some hazards identified here may be judged not to apply. Similarly, for products used only indoors, some environmental hazards may not be applicable.

It must be emphasized that this initial screening considered for the most part only active ingredients in the products. Active ingredients in pesticide products are those that are directly responsible for the pesticidal action. Active ingredients in the products were obtained from product labels. Other ingredients (so-called "inert" ingredients) are not usually listed on labels and are frequently considered proprietary information despite the fact that they may be toxic or otherwise hazardous. Although some hazardous inert ingredients are listed on MSDSs, all inert ingredients could not be identified in most products. Although a court ruled in 1996² that the identity of inert ingredients in pesticide formulations must be available to the public, the information is not disclosed on product

labels and a process for obtaining this information in a timely manner has not yet been established. Thus, while an assessment of inert ingredients would be desirable, it has not been possible at this time. For this reason, hazards of inert ingredients were not evaluated unless included in parameters that relate to the full product formulation, such as product toxicity category or signal word. Only the active ingredients could be screened against lists of carcinogens, reproductive toxicants, and endocrine disruptors. In addition, only active ingredients were evaluated for persistence and mobility in soil.

Procedure

The list of products to be considered was provided in the form of an Excel spreadsheet containing the product name, product type (e.g. herbicide), EPA registration number, active ingredients, and department. Product labels and Material Safety Data Sheets (MSDSs) were provided for most of the 111 products to be evaluated. Most of the products were pesticides, but a few were pesticide adjuvants.

Parameters and Sources of Information

A variety of product and/or ingredient attributes were collected so that the City would be able to use the information against different screening criteria in the future. The parameters used in this analysis are as follows:

Hazard Category (full product):

Each pesticide product registered by EPA is assigned a hazard category I, II, III, or IV by the Agency based on characteristics of the full product formulation, including acute toxicity, and skin and eye irritation. In evaluating the acute data, EPA assigns the hazard category based on the greatest hazard, i.e. ingestion, inhalation, skin absorption, eye irritation, etc. The table below shows the toxicity ranges that apply for each category. (Note: LD50 indicates lethal dose 50%; LC50 indicates lethal concentration 50%.) A relatively non-toxic product (via ingestion, inhalation, or skin absorption) could be placed in the highest hazard category merely on the basis of extreme eye irritation. Products in category I are most hazardous and bear the signal word DANGER on their labels. Those in category II are labeled WARNING. Both category III and IV products are labeled with CAUTION. Product category was determined from label signal words, and category III and IV products were not distinguished from each other.

Oral LD50 (mg/kg):	50	500	5000
Inhalation LC50 (mg/liter)	0.2	2	20
Dermal LD50 (mg/kg)	200	2000	20,000
	↓	↓	↓

EPA Category:*	I	II	III	IV
Signal word:	DANGER	WARNING	CAUTION	CAUTION
Eye effects:	Corrosive non reversible opacity	Severe irritation reversible opacity persisting 7 days	Mod. irritation no opacity reversible 7 days	No irritation
Skin effects:	Corrosive	Severe Irritation	Mod. irritation	Mild irritation

Restricted Use Pesticides:

Some pesticides are restricted to use only by certified pesticide applicators and are not available to the general public because of high toxicity, particularly hazardous ingredients, or environmental hazards. Pesticides designed as restricted use are indicated as such in this analysis. The source of information was the product label.

Carcinogens (active ingredients only):

Various state, federal, and international organizations evaluate or list chemicals for carcinogenicity. Due to the expense and difficulty of such evaluations, not all agencies have reviewed the same chemicals and not all reach the same conclusions on a given chemical. For this reason, we have presented the ratings of several agencies whenever possible. Those agencies and their categories are as follows:

US EPA³

Old system:

- Group A - Human carcinogen
- Group B - Probable human carcinogen
 - B1 - Indicates limited human evidence
 - B2 - Indicates sufficient evidence in animals, inadequate or no evidence in humans
- Group C - Possible human carcinogen
- Group D - Not classifiable
- Group E - Evidence of noncarcinogenicity for humans

New system (weight of evidence categories):

- Known/Likely
- Likely
- Cannot be Determined
- Not Likely

State of California⁴

No categories; single list of chemicals entitled "known to the State of California to cause cancer."

National Toxicology Program (NTP)⁵

- Known to be human carcinogens
- Reasonably anticipated to be human carcinogens

International Agency for Research on Cancer (IARC)⁶

- Group 1 - carcinogenic to humans
- Group 2A - probably carcinogenic to humans
- Group 2B - possibly carcinogenic to humans
- Group 3 - not classifiable as to its carcinogenicity
- Group 4 - probably not carcinogenic to humans

Carcinogenicity information was obtained by screening active ingredients against the above lists. Although MSDSs do indicate listing of ingredients by some of these agencies, the information may not be current or complete. In the tables that accompany these notes, a blank cell in the carcinogenicity columns indicates that the agency has no listing for the chemical. It does not mean that the agency has determined that the chemical is not carcinogenic. The case of conflicting results from different agencies could be a problem in principle, but for the chemicals considered here there were few such conflicts. There were cases where one agency found a chemical to be a possible carcinogen, while another found it to be not classifiable. In such a case, which is not really a conflict, the finding of possible carcinogenicity is the one that would trigger the tier rating as the criteria are written. In the one case of an actual conflict (piperonyl butoxide), the single product where that compound was the only suspected carcinogen was marked as conflicting evidence.

Reproductive/Developmental Toxicants (active ingredients only):

Active ingredients in the products were screened against the State of California lists of reproductive and developmental toxicants.⁴ Blank cells indicate that the compound is not listed.

Endocrine Disruptors: (active ingredients only)

Considerable attention has focused in recent years on the ability of certain chemicals to mimic or block the effects of hormones in humans and other wildlife. Because of the similarity of the endocrine system across many species, its critical role in development and reproduction, and its extreme sensitivity to very low levels of hormone-like compounds, there is the potential for endocrine disrupting substances in the environment to adversely affect wildlife and humans. Although the science is relatively new and in many cases highly controversial, considerable evidence of effects in wildlife and some evidence in humans has caused many scientists to warn of potential dangers from exposure to endocrine disrupting chemicals. Under the Food Quality Protection Act, the EPA is required to screen pesticide ingredients for endocrine system effects. Until that screening is done, a comprehensive list of endocrine disruptors will not be available. For purposes of this analysis, we used the list of endocrine disruptors compiled by the State of Illinois Environmental Protection Agency. Chemicals on this list are classified as known, probable, or suspected of causing endocrine system effects⁷.

Clean Water Act Section 303(d) Pollutants

Section 303(d) of the federal Clean Water Act requires states to compile a list of water bodies with excessive contamination. The list of impaired water bodies for the state of California was downloaded from the State Water Regional Control Board Web site⁸. This list details specific contaminants found in each water body, the main sources of the contaminants, and the priority level. Regions 2 and 5, which contain geographic areas where the City and County of San Francisco conducts operations were searched for contaminants included among ingredients in the list of pesticide products. Five such ingredients were located specifically: boron, copper, chlorpyrifos, diazinon, and malathion. The table below summarizes the number of impaired sites for each contaminant, sorted by source and priority level.

Contaminant	Source	High Priority	Med Priority	Low Priority
boron	ag only	1	0	2
copper	urban/storm water, other	1	6	0
	mining	2	5	7
chlorpyrifos	ag only	3	2	1
	urban/storm water	0	6	0
diazinon	ag only	7	2	1
	urban/storm water	0	4	34
	non-point	0	6	0
	ag-urban	1	3	0
malathion	ag only	0	1	0

These data indicate that aside from those 14 streams where mining operations have contaminated water, copper is a medium to high priority contaminant in San Francisco Bay and a medium priority contaminant in several other streams. Chlorpyrifos from urban storm water runoff was identified in six streams, and six more sites were contaminated from agricultural activities. Diazinon from urban or non-point sources was found to contaminate a total of 48 water bodies, and an additional ten from agricultural-only activities. In addition, a recent study of diazinon runoff traced significant contamination of watersheds to homes using the product and found that the contamination occurred even if the product was used as directed on the label.²⁰ The only water body listed for malathion contamination was for agricultural uses. Similarly, three bodies were listed for agricultural contamination with boron.

Based on the data above, products containing copper, chlorpyrifos, or diazinon were indicated as containing priority 303(d) pollutants.

Ecotoxicity: (active ingredients only)

For purposes of this initial review, information on toxicity to non-target wildlife species was deduced primarily from required precautionary statements on product labels.²¹ While these statements were not specifically designed for making comparisons between products, there are several reasons why this approach was taken:

- 1) As described below, the label warning language follows a hierarchy that is based on the toxicity of the active ingredient and field observations.
- 2) The product label is the primary document that describes the precautions required to use the product in a legal manner. It is the document that every product user should have in their possession and read before using the product.
- 3) The product label is the quickest source of information based on a uniform standard.
- 4) This screening does not consider chronic exposures. While it would be desirable to obtain additional ecotoxicity information in the form of appropriate LD50s, LC50s, and NOELs (no effect levels) or LOELs (lowest observed effect levels), not all Material Safety Data Sheets contain this information, and not all documents that offer some of this information present data for the same species. In addition, the information available may be for active ingredients only and not the full product formulation. Therefore, to pursue the approach of gathering and comparing detailed toxicity values was judged to be beyond the scope of what could be done within the time and budget limits of this evaluation. This level of investigation should occur in the level two toxicology assessment for a reduced number of products.

Toxicity to Birds:

According to EPA regulations,⁹ the required label warnings for avian toxicity are derived in the following manner:

- * Products labeled as "**toxic to birds**" contain an active ingredient with an avian acute oral LD50 of 100 mg/kg or less or a subacute dietary LC50 of 500 ppm or less.
- * Products labeled as "**extremely toxic to birds**" have been shown by accident history or field studies that they may result in fatality to birds.

Additional data for active ingredients was taken from *the Farm Chemicals Handbook*¹⁰ and EXTOXNET¹¹, an Internet web site maintained by cooperative extension in a number of states. Ingredients were classified according to the following scale:

<u>Toxicity Category</u>	<u>Bird acute oral LD50 (mg/kg)</u>
Practically non-toxic (PNT)	>2000.
Slightly toxic (ST)	501-2000
Moderately toxic (MT)	51-500
Highly toxic (HT)	10-50
Very highly toxic (VHT)	<10

This additional information on active ingredient toxicity was not used in any ranking criteria, but was gathered to see if label warnings were consistent with toxicity of the ingredients.

Toxicity to Aquatic Organisms:

According to EPA regulations, the required label warnings for aquatic toxicity are derived in the following manner:

- * Products labeled as "**toxic to fish**" contain an active ingredient with a fish acute LC50 of 1 ppm or less.
- * Products labeled as "**extremely toxic to fish**" have been shown by accident history or field studies that they may result in fatality to fish.

Additional data for active ingredients was taken from *the Farm Chemicals Handbook* and EXTOXNET. Ingredients were classified according to the following scale:

<u>Toxicity Category</u>	<u>Aquatic LC50 (ppm)</u>
Practically non-toxic (PNT)	>100
Slightly toxic (ST)	10-100
Moderately toxic (MT)	1-10
Highly toxic (HT)	0.1-1
Very highly toxic (VHT)	<0.1

This additional information on active ingredient toxicity was not used in any ranking criteria, but was gathered to see if label warnings were consistent with toxicity of the ingredients.

Toxicity to Bees:

According to EPA regulations, the required label warnings for bee toxicity are derived in the following manner:

Honey Bee Toxicity Groups and Cautions

Toxicity Group	Precautionary Statement if Extended Residual Toxicity is Displayed	Precautionary Statement if Extended Residual Toxicity is not Displayed
I Product contains any active ingredient with acute LD50 of 2 µg/bee or less	This product is highly toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds if bees are visiting the treatment area.	This product is highly toxic to bees exposed to direct treatment on blooming crops or weeds. Do not apply this product or allow it to drift to blooming crops or weeds while bees are actively visiting the treatment area.
II Product contains any active ingredient(s) with acute LD50 of greater than 2 µg/bee but less than 11 µg /bee.	This product is toxic to bees exposed to direct treatment or residues on blooming crops or weeds. Do not apply this product if bees are visiting the treatment area.	This product is toxic to bees exposed to direct treatment. Do not apply this product while bees are actively visiting the treatment area.
III All others.	No bee caution required	No bee caution required.

Additional data was evaluated for the active ingredients as a supplemental source. Data for active ingredients was taken from *the Farm Chemicals Handbook* and EXTOWNET.

Ingredients were classified according to the following scale:

Toxicity category	Meaning
Practically non-toxic (PNT)	Relatively nontoxic. Can be used with few precautions with minimum injury to bees.
Moderately toxic (MT)	Kills bees if applied over them. Can be used with limited danger to bees if not applied over bees in the field or hives. Correct dosage, timing, and method of application are essential.
Highly toxic (HT)	Kills on contact during application and for one or more days after.

This additional information on active ingredient toxicity was not used in any ranking criteria, but was gathered to see if label warnings were consistent with toxicity of the ingredients.

Toxicity to other Wildlife or Domestic Animals:

According to EPA regulations, the required label warnings for wildlife toxicity are derived in the following manner:

* Products labeled as "**toxic to wildlife**" contain an active ingredient with an mammalian acute oral LD50 of 100 mg/kg or less..

* Products labeled as "**extremely toxic to wildlife**" have been shown by accident history or field studies that they may result in fatality to wildlife.

In addition, certain products carry label warnings about hazards to domestic animals or secondary hazards to particular species. Given the large number of rodent baits on the product list, the issue of secondary toxicity to predatory mammals and birds was an important issue. Most rodent baits carry label warnings about secondary toxicity hazards. However, available evidence indicates that the level of hazard varies depending on the active ingredient.

In their fact sheet¹² accompanying the full Reregistration Eligibility Decision (RED)¹³, EPA makes the following points:

"Primary toxicity to mammals is very high for all five of these products [brodifacoum, bromadiolone, bromethalin, diphacinone, chlorophacinone]. Primary toxicity to birds is mostly high to very high for the single-feeding compounds (brodifacoum, bromadiolone, bromethalin), but mostly moderate for the multiple-feeding compounds (diphacinone, chlorophacinone). Toxicity to aquatic organisms ranges from moderate to very high.

Available laboratory and/or field data indicate that rodents poisoned with brodifacoum and bromadiolone baits can kill avian and mammalian secondary consumers. Sufficient data also exists to indicate that 0.01% a.i. diphacinone bait is secondarily hazardous to birds and mammals and that 0.01% a.i. chlorophacinone bait is hazardous to mammalian predators.

The Agency believes that there is a high risk of secondary poisoning, especially to mammals, from the use of these rodenticides outdoors (i.e., "around" buildings) in rural and suburban areas. The available data indicate that brodifacoum, bromadiolone, and 0.01% a.i. chlorophacinone and diphacinone baits may pose a secondary hazard to avian and/or mammalian predators that feed on poisoned rodents. Brodifacoum and bromadiolone likely pose the greatest secondary risks, because they are more acutely toxic, especially to birds, more persistent in animal tissues, and can be lethal in a single feeding. In contrast, chlorophacinone and diphacinone tend to be less toxic to birds, less persistent in the tissues of primary consumers, and must be eaten over a period of several days to cause mortality. Therefore, a predator feeding only once on a poisoned carcass may not die if the rodent was poisoned with diphacinone or chlorophacinone, but is more likely to die if the rodent was poisoned with brodifacoum or bromadiolone. Data is being requested in the RED for bromethalin in order to determine secondary risks.

The Agency recently became aware of incident data which suggests that there may be a potential incident problem specifically involving the active ingredient brodifacoum. At this time the Agency is reviewing the data; no final conclusions have been reached. Additionally, through the

"Notice of Availability" for this document, the Agency requests state incident data for all rodenticides to better understand the extent of this potential problem. After review, the Agency may impose additional restrictions on the use of brodifacoum and/or other active ingredients."

Stone et al. in their 1999 paper entitled "Poisoning of wildlife with anticoagulant rodenticides in New York," discuss 51 documented cases (55 individual animals) of non-target wildlife poisoned with rodenticides¹⁴. Although the cases discussed occurred between 1971 and 1997, all but two of them occurred within the past 8 years. The breakdown of active ingredients implicated in these incidents is as follows:

brodifacoum	80% (i.e. about 40 incidents)
diphacinone	4 incidents
bromadiolone	3 incidents (one in combination with brodifacoum)
chlorophacinone	1 incident (in combination with brodifacoum)
coumatetralyl	1 incident (in combination with brodifacoum)
warfarin	4 incidents

The total use patterns of these rodenticides are rather different, however. According to EPA, over the "past few years," the total pounds of active ingredients ranked as follows:

brodifacoum	30%
bromadiolone	20 %
chlorophacinone and diphacinone	20 % combined

Dividing the percent incident involvement by the percent of use highlights the disproportionate number of problems with brodifacoum in this study:

brodifacoum	2.67
diphacinone	0.8 (assuming 10% of sales)
chlorophacinone	0.2 (assuming 10% of sales)
bromadiolone	no data on sales
bromethalin	no data on sales

Thus, brodifacoum seems to be involved in far more than its fair share of poisoning incidents, while chlorophacinone and diphacinone are much less often implicated. Granted, the sample size is small and this is only one study. However, the results seem to support EPA's concern that brodifacoum is most likely to pose secondary risks and chlorophacinone and diphacinone are least likely. Bromadiolone seems to fall in between, and bromethalin cannot be determined from this study.

The table below shows data from EPA on the primary acute oral toxicity of the five compounds to some target and non-target species. These data are most applicable to primary poisoning of non-target organisms from eating rodenticides directly. They also have some relevance to secondary poisoning hazards, although secondary poisonings are also affected by which parts of the rodents are eaten by the predator. If the LD50 for the predator is much higher (i.e. less toxic) than for the target rodent, it means that a margin of safety is present. The higher this ratio the better. The lower part of the table presents the ratio of LD50s for the predator to that for the prey.

The table shows that for brodifacoum, the LD50 for cats is 50 times as large as for rats, giving a substantial margin of safety. For birds, however, the LD50 is about the same or perhaps smaller, indicating a high level of secondary hazard. Although there is not much data for bromadiolone or bromethalin, it appears that bromadiolone may be somewhat safer to birds (based only on quail LD50), while bromethalin is very hazardous both for cats and for quail.

Ingredient/LD50	LD50 rat	LD50 cat	LD50 duck	LD50 pheasant	LD50 other
brodifacoum	0.4895	25	0.26	0.33	4.5 chicken
bromadiolone	0.7	25			154 quail
bromethalin	9.9	18			7.8 quail
chlorophacinone	7.05		100	100	258 quail
diphacinone	2.30	14.7	3158		400-2000 quail

LD50 ratio:	cat	duck	pheasant	other
brodifacoum	51	0.53	1	9
bromadiolone	36	0	0	220
bromethalin	2			1
chlorophacinone	0	14	14	37
diphacinone	6	1373		174-870

In summary, all of the sources mentioned in this discussion seem to indicate a higher level of secondary toxicity for predator birds associated with brodifacoum rodenticides. The same concern probably also applies to the other single dose poisons bromadiolone and bromethalin. Chlorophacinone and diphacinone, especially in the .005% a.i. formulations, appear to be considerably safer for birds. They may still pose a hazard to small mammals, however. Based on this information, all brodifacoum, bromadiolone, and bromethalin baits were placed in Tier I in the rankings, while chlorophacinone and diphacinone baits were placed in Tier II.

Persistence (active ingredients only):

The environmental persistence of compounds varies widely depending on many factors. In addition to the inherent degradability of the compound itself, persistence is affected by where the compound is found (soil, water, air, leaf surface), temperature, moisture, amount of organic matter present, and so on. We chose as a standard measure of persistence the halflife in average soil, disregarding halflives in other media and in extreme soil types. This number, measured in days, is the amount of time required for the concentration of the chemical to decrease by one-half. For consistency, data were taken from the Oregon State University Extension Pesticide Properties Database,¹⁵ the Agricultural Research Service/US Department of Agriculture Pesticide Properties Database,¹⁶ or the Hazardous Substances Databank,¹⁷ in that priority order.

Pesticides are classified as non-persistent, moderately persistent, or persistent based on their halflives.¹⁵ Those classifications are as follows:

Non-persistent	<30 days
Moderately persistent	30-100 days
Persistent	>100 days

In the cases of ingredients which are minerals, biodegradation of the metals does not occur, although the valence state may change, new compounds may be formed, or materials may be washed from the soil or taken up by plants. For minerals, the notation NA indicates not applicable. Halflives were found for most, but not all, ingredients.

When thinking conceptually about degradation of pesticides, it is important to remember that after one halflife, half of the chemical remains. If the decay follows first order kinetics, another halflife would be required before the residue reaches 1/4 of the original. To decrease by one order of magnitude (a factor of 10), more than three halflives are required. So even a pesticide considered non-persistent could remain in average soil at levels of around 10% of the applied concentration for as much as three months.

Water Pollution Hazard (active ingredients only):

The potential for ground-water or surface-water pollution by pesticides is dependent on many factors, including persistence of the ingredients, water solubility, soil binding, amount of rainfall or irrigation, soil properties, amount and frequency of applications, soil slope, vegetation present, proximity to ground- or surface-water, etc. The parameters considered below are those that relate strictly to the pesticide itself. In use, the water pollution risk can often be mitigated by product choices based on site-specific factors. Generally the risk is reduced when soil quality is high, vegetation is dense, and water is distant. The parameters discussed below can be used to identify the products with the highest inherent risk characteristics.

Leaching Potential

The Ground-water Ubiquity Score (GUS) is an empirically derived index that relates pesticide persistence and soil binding to mobility. GUS can be used to rank pesticides for their potential to move toward groundwater.¹⁵ The GUS index is defined mathematically as follows:

$$\text{GUS} = \log_{10}(\text{halflife}) \times [4 - \log_{10}(\text{Koc})]$$

where Koc is the soil sorption coefficient and halflife is the soil halflife in days. GUS values for typical pesticides range from a low of about -6 to a high of about 7. A pesticide movement rating ranging from "extremely low" to "very high" has been assigned to the numerical values by the researchers in the OSU Extension Pesticide Properties Database.¹⁵ The values are as follows:

GUS value	Pesticide Movement Rating
<0.1	extremely low
0.1 - 1.0	very low
1.0 - 2.0	low
2.0 - 3.0	moderate
3.0 - 4.0	high
> 4.0	very high

The GUS index was found for most, but not all, active ingredients in the OSU Database. When it was not found, it was calculated from the halflife and soil binding coefficient, if those were available. In a few cases, even though the GUS index could not be found or calculated due to data gaps, qualitative information on soil binding or mobility was identified in either EXTTOXNET or the Hazardous Substances Databank.

In addition to the GUS index, information on pesticide movement potential was noted from product label warnings about the leachability of the products and/or the detection of such or similar chemicals in ground water. EPA requires two levels of warnings for products with

characteristics determined to result in likely contamination of ground-water from use as labeled.⁹ A lower level of warning is required if no actual detections have occurred or no field studies have been done. A higher level of warning is required if detections have occurred or field studies have shown that the chemical leaches. For purposes of this initial screening, the presence of either warning was considered an indication that the chemical has high mobility. This approach was most consistent with the use of the GUS index, which does not indicate actual detections in ground water or below a certain soil depth. In rare cases where a label ground-water advisory occurs but the GUS index did not indicate high mobility (e.g. glufosinate ammonium), the label advisory was given priority.

Runoff Potential

The potential of a pesticide to run off from the application site with applied (rain or irrigation) water is strongly influenced by its solubility in water and its soil binding. There are two main mechanisms whereby a pesticide can run off: dissolved in water or bound to soil particles. The properties which govern these processes are quite different. A pesticide that binds to soil can run off when the soil particles themselves are washed or eroded away. Products with high risk for this type of runoff have high soil binding, generally considered a desirable property because it prevents movement of the chemicals through or away from the soil. It is my judgment that this type of runoff is best prevented by site-specific factors or by avoiding pesticides entirely rather than by product selection, since the products that have low risk for movement with soil particles are generally those with high risk for groundwater pollution. If erosion is occurring at the site, no pesticide will stay put. For this reason, no parameter was included to evaluate pesticide runoff via adsorption to soil. Although a "runoff potential" is listed in worksheet 2 of the Excel workbook that accompanies these notes, that information was not used because it appears to take account only of this one type of runoff mechanism and was judged of little value in this assessment for the reasons discussed above.

The other type of runoff scenario does lend itself more reasonably to product comparisons. If a pesticide is highly soluble in water but has poor soil binding, it has potential to move with applied water. If that water is tending to move laterally over or through the top layers of soil, the pesticide will move with it. Products at risk for runoff in water would tend to have high solubility, low soil binding, and a long halflife. Most pesticides that have high solubility also have low soil binding¹⁸, so for those products the low soil binding itself is an indication of the potential for both ground-water and surface-water hazard and the GUS index should be a reasonable index of hazard for both processes. The important exception to be considered is products with both high binding and high solubility or low binding and low solubility. The former group will have low GUS values, the latter high GUS values. Some products with low GUS values, considered low risk for ground water, may pose a higher risk for surface water runoff if their solubility is high. On the other hand, some products with high GUS values, considered high risk for leaching, may be less prone to runoff because they do not dissolve in water. I have so far identified no standard benchmarks for making decisions in these cases, but if the City intends to continue using any pesticides near surface water or storm drains, a good GUS score should not automatically indicate low probability for runoff. Other factors must be considered, such as product solubility, application method (i.e. spray, wipe on, etc.), application rate and frequency, application timing, and site conditions that allow substantial water runoff or soil erosion from treated areas. Poor soil, high slope, and absence of vegetation are all risk factors for runoff.

Initial Ranking by Tiers

The City requested that all products on the list be classified into one of three tiers on the basis of their hazards. Products for which labels and/or MSDSs were not provided or critical information could not be found were put into Tier 4.

Tier Definitions

Tier 1: Highest concern

Tier 2: Moderate concern

Tier 3: Lowest concern

Tier 4: Insufficient information available to assign to above tiers

The criteria for assigning products to tiers were as follows:

Tier 1: (Any of the following are true) (All ingredients should be identified so that they can be screened using these tests)

- * Products in EPA Hazard Category I: Signal word DANGER
- * Restricted-use pesticides
- * Products with known, likely, or probable carcinogens as active ingredients
- * Products with reproductive toxicants as active ingredients (CA Prop 65 list)
- * Products with known or probable endocrine disruptors as active ingredients
- * Products containing diazinon, chlorpyrifos, or copper, identified as important causes of impaired water bodies in California Regions 2 and 5 under section 303(3) of the Clean Water Act
- * Products labeled as highly toxic or extremely toxic to birds, aquatic species, bees, or wildlife.
- * Products with active ingredients with soil half-lives greater than 100 days (not applicable to products used only indoors or to products used only in bait stations)
- * Products with active ingredients with mobility ratings high or very high or with specific label warnings about groundwater hazard. (not applicable to products used only indoors or to products used only in bait stations)
- * Products containing the rodenticides brodifacoum, bromethalin, or bromadiolone

Tier 2:

- * All products not specifically assigned to tier 1 or tier 3.

Tier 3: (All of the following are true) (All ingredients should be identified so that they can be screened using these tests)

- * Product contains no possible or probable carcinogens
- * Product contains no reproductive toxicants (CA Prop 65 list)
- * Product contains no ingredients listed by Illinois EPA as known, probable, or suspect endocrine disruptors
- * Active ingredient has soil half-life of 30 days or less (exception for minerals)
- * Active ingredient has extremely low or very low mobility in soils.
- * Product is not labeled as toxic to fish, birds, bees, wildlife, or domestic animals.

Tier 4: Not enough information.

Product registration or label not found

or

Key data not located for active ingredient (half-life, soil binding, ecotoxicity, etc.)

Discussion

Within the context of an Integrated Pest Management program, choices of which control methods to use are based on many factors, including product hazards, label restrictions, effectiveness, site-specific factors, and available alternatives. The work reported here can be used to compare certain product attributes to screen products for desirability of use. It should be reiterated that actual risk from using products depends on many factors, some of which are not product dependent, such as weather, site conditions, application rates, and so on.

The decisions as to which products to use and which to discontinue requires applying a set of criteria over the hazard matrix to group the products into tiers. Only one set of criteria is offered here as an example. The criteria proposed here are very similar to those adopted by the City of Seattle earlier this year after a review of their pesticide products. The Seattle criteria were reviewed by Debbie Raphael, Pesticide Program Coordinator for the City of San Francisco who requested the use of the same basic criteria for assessing San Francisco's products. The only changes were the addition of the Clean Water Act Section 303(d) pollutants and the elimination of several criteria related to state of Washington lists.

Recommendations

1. The enclosed set of screening criteria is proposed as a starting point that identifies important issues of concern that can be used as a basis for prioritizing products for phase-out, restrictions, or further review. This screening should be considered as preliminary.
2. The City should use the ranking charts from the preliminary screening with the following understanding:
 - a) Blank cells can mean that tests have not been done or other information is unavailable.
 - b) Some criteria may be found not to apply to products (including those in Tier 1) after uses are analyzed.
 - c) Placement of a product in Tier 2 or even Tier 3 does not mean that the product is necessarily safe. In addition, concerns raised by the presence of unknown, so-called "inert" ingredients should be addressed (see point #3 below).
3. The City should require knowledge of all ingredients in any products they continue to use. These additional "inert" (non-active) ingredients should then be screened against the same lists as the active ingredients, as shown in the flow chart. Without this information, it is impossible to do a valid scientific review. A recent study of poor salmon returns in Canada¹⁹ hypothesizes that the culprit may be an inert ingredient (nonylphenol) in pesticides applied over the watershed. If this hypothesis is proven, the situation would illustrate very clearly the importance of non-active ingredients in environmental safety. It would be fruitless to select products for salmon protection without knowing the identity of toxic inert ingredients that have produced toxic effects in salmon. In other words, you can rule out a product without knowing all ingredients, but you cannot with certainty rule it in.

Tables with Tier Assignments

The third column of the table in Attachment B lists the hazard tier designations for each of the pesticide products on the adopted list. For complete listings for each product contact Debbie Raphael at (415) 554-6399.

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DEPARTMENT OF THE ENVIRONMENT
CITY AND COUNTY OF SAN FRANCISCO
FRANCESCA VIETOR, DIRECTOR

Integrated Pest Management Program List 2000

Preamble

The following list represents the pesticide products approved for use under San Francisco's Integrated Pest Management Ordinance (Adopted 10/96, Section 39.8(f), San Francisco Municipal Code). The list will be updated on an as-needed basis to reflect the availability of new reduced risk products and the removal of products with the greatest human health and environmental concern. Products are designated as Allowed (A), Limited Use (L), and Limited Use of Special Concern (L*). Each limited use product is accompanied by the specific circumstances under which it is approved for use. In all cases, restrictions on use as determined by the label are to be followed as required by law.

Integrated Pest Management (IPM) Programs involve a number of elements to control pests while ensuring a safe working and play environment. Chemical pesticides represent only a single control strategy and are used only as a last resort. Thus all chemicals included in the Adopted List are assumed to be used only after programs are in place to improve sanitation, prevent pest infestation, and implement non-chemical management measures. If such a pest management program proves insufficient to control a pest then the chemicals listed below may be utilized as tools according to the restrictions specified for each pesticide product.

San Francisco's IPM ordinance allows for chemicals to be used that are not on the Adopted List through an exemption process. The Department of the Environment reviews all exemption requests and exemptions will only be granted in cases of well-documented need for the pesticide and when all other alternatives have been tried or deemed impractical. In addition, requesting departments must develop a pest management plan for preventing further use of the pesticide.

One important goal of an IPM program is to reduce the unnecessary use of chemical pesticides. In relation to this goal, the term, targeted application, refers to pesticides applied only to the pest and not to adjacent non-targets. Several products on the Adopted List, specifically pre-emergent herbicides, fungicides, and some post-emergent herbicides are used in broadcast applications where the product is spread over an entire area and not just onto the targeted pests. Although these products currently meet the reduced risk criteria, their use is of special concern in an IPM program. It is the goal of the IPM program to phase out the use of these products and departments who use them will be expected to track their use closely, develop alternative control strategies and justify the continuing need for these products at the end of the year.

1540 MARKET STREET, SUITE 160, SAN FRANCISCO, CALIFORNIA 94102

WWW.CLSE.CA.US/ENVIRONMENT

TELEPHONE (415) 554-6390 • FAX (415) 554-6393 • E-MAIL: ENVIRONMENT@CLSE.CA.US

Pesticide Type A=aquatic F=fungicide I=insecticide H=herbicide S=slug V=vertebrate	Use Category A = allowed L = limited L* = special concern	Hazard Tier (defined by Dr Phil Dickey, WPA Toxics Coalition)	Product Name	Active Ingredients	EPA Reg #	Use Limitations
A	A	III	Aquashade	acid yellow-23, acid blue 4	33068-1-AA-33068	
F	A	III	Kaligreen	potassium bicarbonate	70231-1	
F	A	IV	Root Shield	Trichoderma harzianum	68539-4	
F/I	A	II	JMS Stylet Oil	petroleum distillates	65564-1-AA-65564	
F/I	A	II	Triact 90EC	neem oil	70051-8-AA-70051	
F/I	A	II	Volic Supreme Spray	petroleum oil	59639-20-AA-59639	
H	A	III	Bio-Waerd	corn gluten meal	1051098-30001	
H	A	III	Supressa	corn gluten meal	1051074-30001-AA	
H	A	IV	Scythe (post-emerg.)	pelargonic acid	53219-7	
I	A	III	Advance Dual Choice Ant Bait	sulfuramid	499-459-AA-499	
I	A	II	Avert Cockroach Bait Station	abamectin	499-467-AA-499	
I	A	II	Avert Gel	abamectin	499-410-AA	
I	A	II	Avert Pressurized Cockroach Bt	abamectin	499-322	
I	A	II	Drax Ant Kill-PF	orthoboric acid	9444-131-AA-9444	
I	A	III	EcoPCO AC contact insect.	hexa-hydroxyl, eugenol	67425-4	
I	A	III	EcoPCO D dust insect.	hexa-hydroxyl, eugenol	67425-2	
I	A	III	EcoPCO Jet contact insect.	hexa-hydroxyl, eugenol	67425-5	
I	A	III	FluorGuard Ant Control Bait	sulfonamide	1812-348-279	
I	A	II	Mosquito Dunks	Bacillus Thuringiensis	6218-47	
I	A	III	Vectobac G (mosquitoes)	Bacillus Thuringiensis	275-50	
I	A	III	Vectolex granules	Bacillus sphaericus	275-77AA-275	
S	A	III	Dipel 2X worm killer, WP	Bacillus Thuringiensis	275-37-AA-275	
S	A	III	Sluggo	iron phosphate	67702-3-AA-67702	Emergent plants in ponds, lakes, drainage canals. Only as a last resort when other mgmt. practices are ineffective.
A	L	II	Rodeo Aquatic	glyphosate	524-343-AA-524	Emergent plants in ponds, lakes, drainage canals. Only as a last resort when other mgmt. practices are ineffective.
A	L	II	Sonar	lluridone	67690-4	
F	L	II	3336 GC	thiophanate-methyl	1001-63	
F	L	II	3336 WP	phenylenebis-thioallophanate	1001-63	
F	L	II	Proturi Systemic Fungicide	thiophanate-methyl	538-88-ZA-538	
H	L	II	E-zject Capsules	glyphosate	524-135	
H	L	II	Garlon 4	triclopyr	62719-40-ZB-62719	Targeted treatment of evasive exotics in parks, natural areas, right of ways. OK for fire suppression, pilot alternative strategies.
H	L	II	Oust (pre/post)	sulfometuron-methyl	352-401	Flights of ways
H	L	II	Roundup Pro (post-emerg.)	glyphosate	524-475-ZA-524	Targeted treatment of areas inaccessible or too dangerous for hand methods, right of ways, cracks in hardscape as last resort, utility access, fire prevention. OK for renovation but must pilot alternative strategies.

Pesticide Type A=aquatic F=fungicide I=insecticide H=herbicide S=slug V=vertebrate	Use Category A = allowed L = limited L* = special concern	Hazard Tier (defined by Dr. Philip Dickey, WA Toxics Coalition)	Product Name	Active Ingredients	EPA Reg #	Use Limitations
H	L	II	Turlon Ester (post)	triclopyr	62719-258-AA-62719	targeted treatment of turf; broadcast application requires exemption
I	L	II	Agnique MMF surface film	isooctadecyl-hydroxyl	2302-14	Standing water, human health concerns.
I	L	I	Allosid Briquets	methoprene	2724-241-64833	PUC for contained sewage treatment facilities
I	L	II	Avid	avermectin	618-96-AA-618	Nursery use only.
I	L	II	Borid	boric acid	944-129-ZA-9444	limit human exposure to dust
I	L	III	Enstar II IGR	kinoprene	55947-82-ZA-55947	Nurseries, roses
I	L	IV	Genrol -cockroach	hydroprene	2724-304-50809	minimize use through prevention
I	L	II	Maxforce Ant Bait Station	flupronil	64248-10	minimize use through prevention, possible concern over active ingredient
I	L	II	Maxforce Carpenter Ant Bait	flupronil	64248-21	minimize use through prevention, possible concern over active ingredient
I	L	II	Maxforce Roach bait station	flupronil	64248-11	minimize use through prevention, possible concern over active ingredient
I	L	II	Maxforce Roach Killer gel	flupronil	64248-14	minimize use through prevention, possible concern over active ingredient
I	L	II	Microcare formula 1	piperon, butoxide, pyrethrins	499-381	Structural crack and crevice, spot spray. Emphasize use of baits.
I	L	II	M-pede	potassium salts /fatty acids	53219-6-AA-53219	Nursery and specialty gardens only.
I	L	II	Neemazad	Azadirachtin	11688-5	Nursery use only. Avoid contact with bees.
I	L	II	Precor IGR Concentrate	methoprene	2724-352-50809	minimize use through vacuuming and host exclusion
I	L	IV	Terro Ant Killer	sodium tetraborate	149-8-AA-149	limit human exposure to dust
I	L	II	WaspFreeze	phenothrin, allethrin, CO2	499-362-AA-499	Use only when a concern for public safety.
I	L	II	Niban granular bait	isoboric acid	64405-2-AA-64405	Outdoor restricted to planted areas, prefer containers; indoor must be in containers or inaccessible to humans
V	L	I	Confrac Blox	bromadiolone	12455-79	High concern over 2nd poisoning, see site specific limits
V	L	II	Dirac supersize blox	diphacinone	12455-14	Concern over 2nd poisoning, see site specific limits.
V	L	II	Eatons all-weather bait block	diphacinone	56-41-AA-56	Concern over 2nd poisoning, see site specific limits.
V	L	II	Eatons Answer, pocket goph.	diphacinone	56-57-AA-56	Damage to: dams, levies, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.
V	L	I	Final Blox	brodifacoum	12455-89	Extreme concern over 2nd poisoning, see site specific limits
V	L	IV	Generation Blocks	diethalothione		Unknown effects on 2nd poisoning, single feed,
V	L	IV	Generation Mini-blocks	diethalothione		Unknown effects on 2nd poisoning, single feed,
V	L	IV	Generation Pellets	diethalothione		Unknown effects on primary and 2nd poisoning, single feed,
V	L	I	Maki Parallin Block	bromadiolone	7173-189	High concern over 2nd poisoning, see site specific limits

City & County of San Francisco Integrated Pest Management Program

List 2000

Pesticide Type A=aquatic F=fungicide I= insecticide H=herbicide S=slug V=vertebrate	Use Category A = allowed L = limited L* = special concern	Hazard Tier (defined by Dr. Philip Dickey, WA Toxics Coalition)	Product Name	Active Ingredients	EPA Reg #	Use Limitations
V	L	I	Talon G mini pellets	brodifacoum	10182-341-AA-10182	Extreme concern over primary and 2nd poisoning, see site specific limits.
V	L	IV	Vengeance	bromethalin	432-748-AA-432	High concern over 2nd poisoning
V	L	I	Weather Block	brodifacoum	101082-339-AA-10182	Extreme concern over 2nd poisoning, see site specific limits
V	L	II	Wilco Gopher Getter, type 2	chlorophacinone	36029-50003-AA-36029	Damage to: dams, levies, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.
V	L	II	Wilco Ground Squirrel bait	chlorophacinone	36029-50004-AA	Damage to: dams, levies, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.
adjuvant	L*	IV	Activator 90	alkylene ether, fatty acids	36208-50014-AA-36208	3 month use until surfactant is identified and/or a replacement product is found without surfactant of concern.
F	L*	I	Champ Formula	copper hydroxide	55146-64	One year limit, Conservatory
F	L*	I	Heritage	azoxystrobin	10182-408-AA-10182	Greens, highest profile athletic fields
H	L*	I	Pro turf K-O-G Weed Control	dicamba	538-112-AA-538	One year limit, targeted treatment only of greens, priority for replacement; broadcast application requires exemption.
H	L*	IV	Manage (pre/post emerg.)	carbonylaminosulfonyl	524-465-AA	One year limit. Purple and yellow nutsedges, horsetail.
H	L*	II	Pendulum (pre-emergent)	pendimethalin	241-340	Minimize use through irrigation repairs.
H	L*	I	Vanquish (post)	dicamba(dichloro anisic acid)	55947-46-AA-55947	One year limit. Renovations, highest priority plantings (not to be used on playgrounds), dam faces, fire prevention.
I	L*	I	Marathon Granular	imidacloprid	3125-452-59807	One year limit, targeted treatment only of Greens and highest profile athletic fields; broadcast application requires exemption
I	L*	I	Maxforce granules	hydromethylnon	64248-6	One year limit. Nursery use only. Use only in containerized stock, not for use in propagation beds.
I	L*	I	Sun Spray Ultra-line Spray Oil	paraffinic oil	862-23-AA-53219	Pharaoh ants, outdoor prefer use in containers, granules to be placed only in planted areas.
I	L*	I	Tempo 20 WP	cyfluthrin	3125-380-AA-3125	One year limit. Nursery and roses.
S	L*	I	Deadline	metalddehyde	64864-1	One year limit. Nursery use only.
S	L*	I	Durham granules 3.5	metalddehyde	5481-99	One year limit. Prefer in containers or use of alternative.

Site-Specific Rodenticide Plan For Control of Rats and Mice. 12/8/99

Due to the concern over primary and secondary poisoning the type of rodenticide and the manner in which it is applied will be determined by the general site characteristics.

- *Landscaped area*: area under cultivation
- *Natural area*: within urban setting or wilderness, significant wildlife concern
- *Primary poisoning*: non-target animal eats poison directly
- *Secondary poisoning*: non-target animal eats poisoned target animal as prey

General Site Description

Rodenticide Use

Interior of structures with occupants
(i.e. office space, recreation sites)

Trapping only.

Interior of non-enclosed structures
(i.e. storage, stables, airport service areas)

Secure and anchored bait stations can be placed inside on a preventative basis. Single feeding OK especially when other sources of food are present and when have public health concerns (ex. Haunta)

Exterior of structures in urbanized areas
(i.e. perimeter of offices)

Secure and anchored bait stations around perimeter, single feeding OK but use Brodifacoum as last resort. No broadcast baits or pellets. Use mouse sized pellets only, must be placed far into burrows.

Exterior of structures in natural areas

Multiple feeding baits secured within bait boxes or buried in burrows. No pellets. Single feeding bait used only as last resort in case of human health concern or structural integrity.

Inside of sewers or sewage treatment facilities

Baits must be secured either inside the sewer or inside a bait box. Any single feeding OK.

Landscape not adjacent to a natural area

Bait placed deep inside burrows, minimize use of pellets, mouse sized pellets only, must be buried deep in the burrow. Use Brodifacoum as last resort.

Natural area or landscape adjacent to a natural area

Baiting should be limited to sensitive sites (ex. campfire area) otherwise emphasis is on preventing infestation of structures. Multiple feeding baits that are secured inside bait boxes or burrows. No use of pellets or single feeding rodenticides.



DEPARTMENT OF THE ENVIRONMENT

CITY AND COUNTY OF SAN FRANCISCO

FRANCESCA VIETOR, DIRECTOR

Integrated Pest Management Program List 2000

September, 2000

Preamble

The following list represents the pesticide products approved for use under San Francisco's Integrated Pest Management Ordinance (Adopted 10/96, Section 39.8(f), San Francisco Municipal Code). The list will be updated on an as-needed basis to reflect the availability of new reduced risk products and the removal of products with the greatest human health and environmental concern. Products are designated as Allowed (A), Limited Use (L), and Limited Use of Special Concern (L*). Each limited use product is accompanied by the specific circumstances under which it is approved for use. In all cases, restrictions on use as determined by the label are to be followed as required by law.

Integrated Pest Management (IPM) Programs involve a number of elements to control pests while ensuring a safe working and play environment. Chemical pesticides represent only a single control strategy and are used only as a last resort. Thus all chemicals included in the Adopted List are assumed to be used only after programs are in place to improve sanitation, prevent pest infestation, and implement non-chemical management measures. If such a pest management program proves insufficient to control a pest then the chemicals listed below may be utilized as tools according to the restrictions specified for each pesticide product.

San Francisco's IPM ordinance allows for chemicals to be used that are not on the Adopted List through an exemption process. The Department of the Environment reviews all exemption requests and exemptions will only be granted in cases of well-documented need for the pesticide and when all other alternatives have been tried or deemed impractical. In addition, requesting departments must develop a pest management plan for preventing further use of the pesticide.

One important goal of an IPM program is to reduce the unnecessary use of chemical pesticides. In relation to this goal, the term, *targeted application*, refers to pesticides applied only to the pest and not to adjacent non-targets. Several products on the Adopted List, specifically pre-emergent herbicides, fungicides, and some post-emergent herbicides are used in broadcast applications where the product is spread over an entire area and not just onto the targeted pests. Although these products currently meet the reduced risk criteria, their use is of special concern in an IPM program. It is the goal of the IPM program to phase out the use of these products and departments who use them will be expected to track their use closely, develop alternative control strategies and justify the continuing need for these products at the end of the year.

11 Grove Street, SAN FRANCISCO, CALIFORNIA 94102

WWW.CI.SF.CA.US/ENVIRONMENT

TELEPHONE (415) 554-6390 FAX 554-6393 E-MAIL: ENVIRONMENT@CI.SF.CA.US

Site-Specific Rodenticide Plan For Control of Rats and Mice. 12/8/99

Due to the concern over primary and secondary poisoning the type of rodenticide and the manner in which it is applied will be determined by the general site characteristics.

Landscaped area: area under cultivation

Natural area: within urban setting or wilderness, significant wildlife concern

Primary poisoning: non-target animal eats poison directly

Secondary poisoning: non-target animal eats poisoned target animal as prey

General Site Description

Rodenticide Use

Interior of structures with occupants
(i.e. office space, recreation sites)

Trapping only.

Interior of non-enclosed structures
(i.e. storage, stables, airport service areas)

Secure and anchored bait stations can be placed inside on a preventative basis. Single feeding OK especially when other sources of food are present and when have public health concerns (ex. Haunta)

Exterior of structures in urbanized areas
(i.e. perimeter of offices)

Secure and anchored bait stations around perimeter, single feeding OK but use Brodifacoum as last resort. No broadcast baits or pellets. Use mouse sized pellets only, must be placed far into burrows.

Exterior of structures in natural areas

Multiple feeding baits secured within bait boxes or buried in burrows. No pellets. Single feeding bait used only as last resort in case of human health concern or structural integrity.

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Landscape not adjacent to a natural area

Bait placed deep inside burrows, minimize use of pellets, mouse sized pellets only, must be buried deep in the burrow. Use Brodifacoum as last resort.

Natural area or landscape adjacent to a natural area

Baiting should be limited to sensitive sites (ex. campfire area) otherwise emphasis is on preventing infestation of structures. Multiple feeding baits that are secured inside bait boxes or burrows. No use of pellets or single feeding rodenticides.

Pesticide Type A=aquatic F=fungicide I=insecticide H=herbicide S=sing V=vertebrate	Use Category A = allowed L= limited L* = special concern	Hazard Tier (defined by Dr. Philip Dickey, WA Toxics Coalition)	Product Name	Active Ingredients	EPA Reg #	Use Limitations
F	L	II	3336 GC	thiophanate-methyl	1001-63	Greens, highest profile athletic fields
F	L	II	3336 WP	phenylenebis-thioallophanate	1001-63	Greens, nursery, roses
			Advance Dual Choice Ant			
I	A	III	Bait	sulfuramid	499-459-AA-499	
I	L	II	Agnique MMF surface film	isooctadecyl-hydroxyl	2302-14	Standing water, human health concerns.
I	L	I	Alloisd Biquels	methoprene	2724-241-64833	PUC for contained sewage treatment facilities
F	L	IV	AQ 10 Biofungicide	Ampelomyces	55638-16	Nurseries, roses, dahlias for powdery mildew. More information is needed an active ingredient.
A	A	III	Aquashade	acid yellow-23, acid blue 4	33068-1-AA-33068	
I	A	II	Avert Cockroach Bait Station	abamectin	499-467-AA-499	
I	A	II	Avert Gel	abamectin	499-410-AA	
I	A	II	Avert Pressurized Cockroch Bt	abamectin	499-322	
I	L	II	Avid	avermectin	618-96-AA-618	Nursery use only.
I	L	II	Azatin XL	Azadirachtin	70051-27-59807	Nurseries and established plants for interiorscapes.
H	A	III	Bio-Weed	corn gluten meal	1051098-30001	
I	L	II	Borid	boric acid	944-129-ZA-9444	limit human exposure to dust
I	L	III	BolanGard ES	Beauveria bassiana strain	65626-8	Control of thrips on landscaped plants. Biological product but some concern over bee toxicity.
F	L*	I	Champ Formula	copper hydroxide	55146-64	One year limit, Conservatory
I	A	III	Cinnamite	Cinnamaldehyde	58866-12-ZA-65626	
adjutant	A	III	CMR Silicone Surfactant	poly(methylsiloxane, nonionic.	1050775-50025-AA	
F	L	IV	Companion	Bacillus species	71065-EUP-1	golf course turf, need more info on active ingred. High concern over 2nd poisoning, see site specific limits
V	L	I	ContraC Blox	bromadiolone	12455-79	One year limit. Prefer in containers or use of alternative.
S	L*	I	Deadline	metaldelhyde	64864-1	
S	A	III	Dipel 2X worm killer, WP	Bacillus Thuringiensis	275-37-AA-275	
hormone	A	III	Dipn Grow	indole-3-butyric acid	64388-1	
V	L	II	Ditrac super-size blox	diphenacine	12455-14	Concern over 2nd poisoning, see site specific limits.
I	L	II	Dr. Moss Liquid Ant Bait	orthoboric acid 1%	56-72	precautions over exposure to boric acid
I	L	II	Drax Ant Kil Gel	orthoboric acid	9444-131	precautions over exposure to boric acid
I	A	II	Drax Ant Kil-PF	orthoboric acid	9444-131-AA-9444	
S	L*	I	Durham granules 3.5	metaldelhyde	5481-99	One year limit. Prefer in containers or use of alternative.
V	L	II	Eatons all-weather bait block	diphenacine	56-41-AA-56	Concern over 2nd poisoning, see site specific limits.

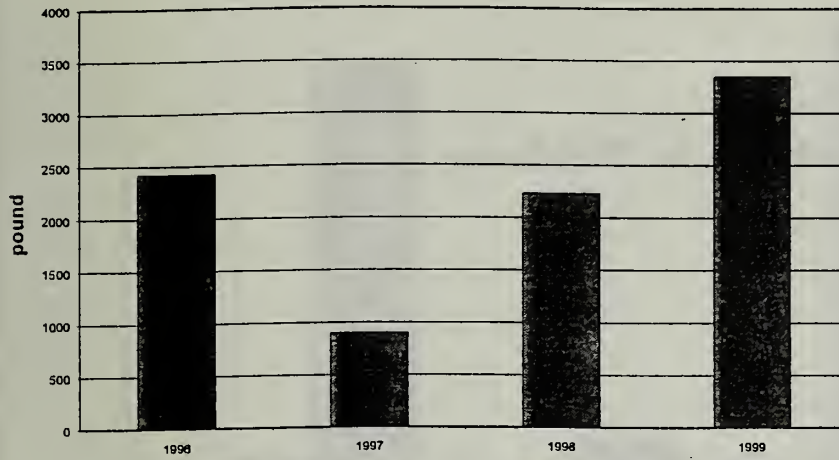
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V	L	II	Ealons Answer, pocket goph.	diphacinone	56-57-AA-56	Damage to: dams, levees, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.
I	A	III	EcoPCO AC contact insect.	hexa-hydroxyl, eugenol	67425-4	
I	A	III	EcoPCO D dust insect.	hexa-hydroxyl, eugenol	67425-2	
I	A	III	EcoPCO Jet contact insect.	hexa-hydroxyl, eugenol	67425-5	
I	L*	I	Endeavor	Pyrethrozine	100-913	One year limit, nursery use only. Needs more toxicology data on new active ingredient
I	L	III	Enstar II IGR	kinoprene	55947-82-ZA-55947	Nurseries, roses
H	L	II	E-zject Capsules	glyphosate	524-135	Tree stump injection, prefer mechanical methods
V	L	I	Final Blox	brodiflaccoum	12455-89	Extreme concern over 2nd poisoning, see site specific limits
I	A	III	FluorGuard Ant Control Bait	sulfonamide	1812-348-279	
H	L	II	Garlon 4	triclopyr	62719-40-ZB-62719	Targeted treatment of evasive exotics in parks, natural areas, right of ways. OK for fire suppression, pilot alternative strategies.
V	L	IV	Generation Blocks	diethialone		Unknown effects on 2nd poisoning, single feed.
V	L	IV	Generation Mini-blocks	diethialone		Unknown effects on 2nd poisoning, single feed, Unknown effects on primary and 2nd poisoning, single feed.
V	L	IV	Generation Pellets	diethialone		
I	L	IV	Genrol -cockroach	hydroptrene	2724-304-50809	minimize use through prevention
F	L*	I	Heritage	azoxystrobin	10182-408-AA-10182	Greens, highest profile athletic fields
F/I	A	II	JMS Stylet Oil	petroleum distillates	65564-1-AA-65564	
F	A	III	Kaligreen	potassium bicarbonate	70231-1	
V	L	I	Maki Paraffin Block	bromadiolone	7173-189	High concern over 2nd poisoning, see site specific limits
H	L*	IV	Manage (pre/post emerg.)	carbonylaminosulfonyl	524-465-AA	One year limit. Purple and yellow nutsedges, horsetail. Minimize use through irrigation repairs.
I	L*	I	Marathon Granular	imidacloprid	3125-452-59807	One year limit. Nursery use only. Use only in containerized stock, not for use in propagation beds.
I	L	II	Maxforce Ant Bait Station	fipronil	64248-10	minimize use through prevention, possible concern over active ingredient
I	L	II	Maxforce Carpenter Ant Bait	fipronil	64248-21	minimize use through prevention, possible concern over active ingredient
I	L*	I	Maxforce granules	hydromethylnon	64248-6	Pharoah ants, outdoor prefer use in containers, granules to be placed only in planted areas.
I	L	II	Maxforce Roach bait station	fipronil	64248-11	minimize use through prevention, possible concern over active ingredient
I	L	II	Maxforce Roach Killer gel	fipronil	64248-14	minimize use through prevention, possible concern over active ingredient
I	L	II	Microcare PT 175	piperon, butoxide, pyrethrins	499-381-AA-499	Structural crack and crevice, spot spray. Emphasize use of baits.

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I	A	II	Mosquito Dunks	Bacillus Thuringiensis	6218-47	Nursery and specialty gardens only.
I	L	II	M-pede	potassium salts /fatty acids	53219-6-AA-53219	Nursery use only. Avoid contact with bees.
I	L	II	Neemazad .25 EC	Azadirachtin	70051-5	Outdoor restricted to planted areas, prefer containers; indoor must be in containers or inaccessible to humans
I	L	II	Niban granular bait	isoboric acid	64405-2-AA-64405	Rights of ways
H	L	II	Oust (pre/post)	sulfometuron-methyl	352-401	One year limit. Renovations, highest priority plantings (not to be used on playgrounds), dam faces, fire prevention.
H	L*	II	Pendulum (pre-emergent)	pendimethalin	241-340	minimize use through vacuuming and host exclusion
I	L	II	Precor IGR Concentrate	methoprene	2724-352-50809	One year limit, targeted treatment only of greens, priority for replacement; broadcast application requires exemption.
H	L*	I	Pro turf K-O-G Weed Control	dicamba	538-112-AA-538	Greens, highest profile athletic fields
F	L	II	Pro turf Systemic Fungicide	thiophanate-methyl	538-88-ZA-538	Emergent plants in ponds, lakes, drainage canals. Only as a last resort when other mgmt. practices are ineffective.
A	L	II	Rodeo Aquatic	glyphosate	524-343-AA-524	Nursery use only. Problem with mixing and storage due to talc.
F	A	IV	Root Shield	Trichoderma harzianum	68539-4	same limitations as Roundup Pro
F	L*	I	Rootone F/fungicide	Thiram	264-499-AA-5887	Targeted treatment of areas inaccessible or too dangerous for hand methods, right of ways, cracks in hardscape as last resort, utility access, fire prevention. OK for renovation but must pilot alternative strategies.
H	L	II	Roundup Pro Dry Pack	glyphosate	524-505	Emergent plants in ponds, lakes, drainage canals. Only as a last resort when other mgmt. practices are ineffective.
H	L	II	Roundup Pro (post-emerg.)	glyphosate	524-475-ZA-524	
H	A	IV	Scythe (post-emerg.)	pelargonic acid	53219-7	
S	A	III	Sluggo	iron phosphate	67702-3-AA-67702	
A	L	II	Sonar	fluridone	67690-4	
adjuvant	A	III	Spraytech Oil	soybean oil	65328-50001-AA-65328	
I	L*	I	Sun Spray Ultra-fine Spray	paraffinic oil	862-23-AA-53219	One year limit. Nursery and roses.
H	A	III	Supressa	corn gluten meal	1051074-30001-AA	Extreme concern over primary and 2nd poisoning, see site specific limits.
V	L	I	Talon G mini pellets	brodifacoum	10182-341-AA-10182	One year limit. Nursery use only.
I	L*	I	Tempo 20 WP	cyfluthrin	3125-380-AA-3125	limit human exposure to dust
I	L	IV	Terro Ant Killer	sodium tetraborate	149-8-AA-149	

Pesticide Type A=aquatic F=fungicide I=insecticide H=herbicide S=sing V=vertebrate	Use Category A = allowed L = limited L* = special concern	Hazard Tier (defined by Dr. Philip Dickey, WA Toxics Coalition)	Product Name	Active Ingredients	EPA Reg #	Use Limitations
F/I	A	II	Triact 90EC	neem oil	70051-8-AA-70051	
H	L	II	Turfion Ester (post)	triclopyr	62719-258-AA-62719	targeted treatment of turf, broadcast application requires exemption
H	L*	I	Vanquish (post)	dicamba(dichloro anisic acid)	55947-46-AA-55947	One year limit, targeted treatment only of Greens and highest profile athletic fields, broadcast application requires exemption
I	A	III	Vectobac G (mosquitoes)	Bacillus Thuringiensis	275-50	
I	A	III	Vectolex granules	bacillus sphaericus	275-77AA-275	
V	L	IV	Vengance	bromethalin	432-748-AA-432	High concern over 2nd poisoning
F/I	A	II	Volck Supreme Spray	petroleum oil	59639-20-AA-59639	
I	L	II	WaspiFreeze	phenothrin, allethrin, CO2	499-362-AA-499	Use only when a concern for public safety.
V	L	I	Weather Block	brodifacoum	101082-339-AA-101082	Extreme concern over 2nd poisoning, see site specific limits
V	L	II	Wilco Gopher Getter, type 2	chlorophacinone	36029-50003-AA-36029	Damage to: dams, levies, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.
V	L	II	Wilco Ground Squirrel bait	chlorophacinone	36029-50004-AA	Damage to: dams, levies, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.

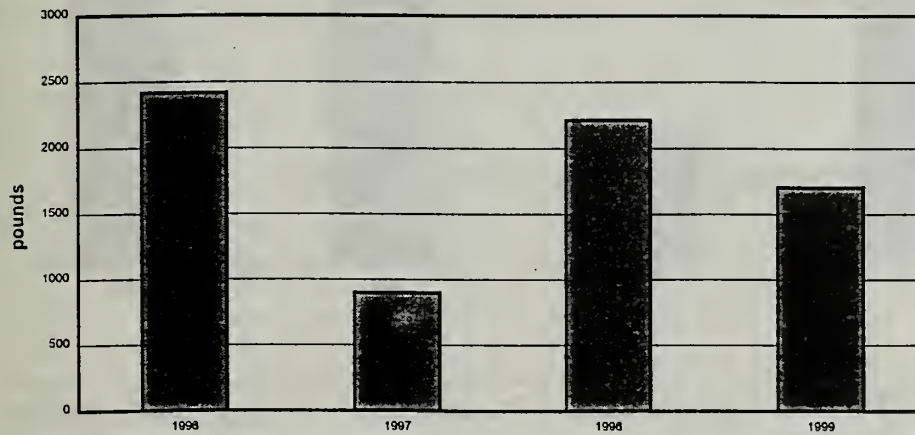
Trends in Pesticide Use Recreation and Parks Department

Total Pesticide Use for Rec/Parks

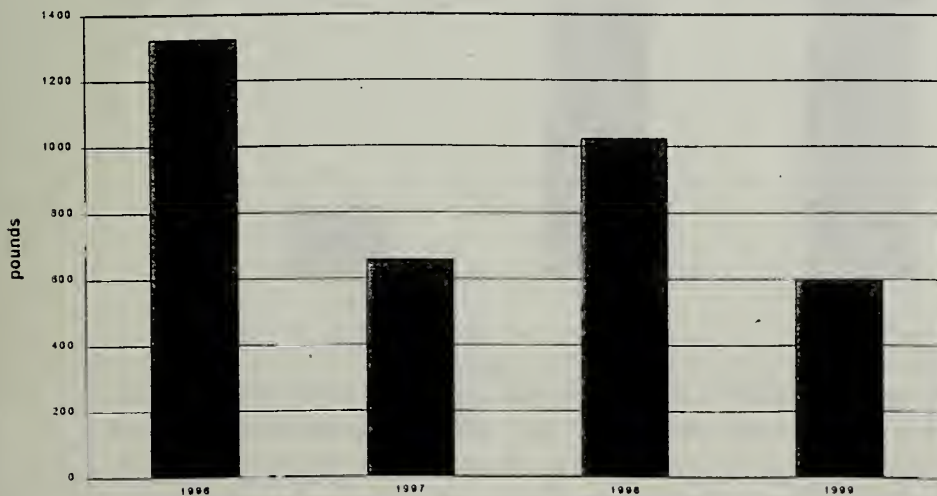


These graphs show the challenge of looking only at pounds of pesticides used. When corn gluten meal is removed from the data an increase in pesticide use becomes a significant decrease.

Rec/Parks Use - no corn gluten

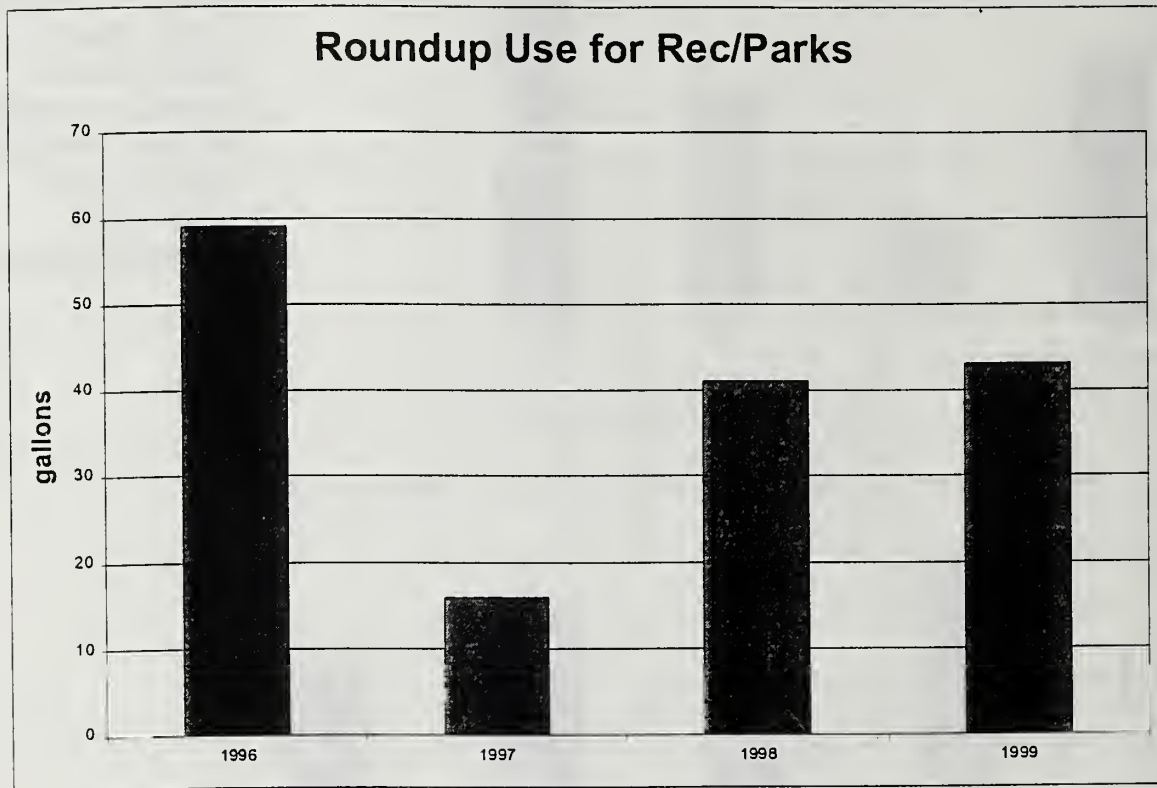


Rec/Park Use no golf no corn gluten



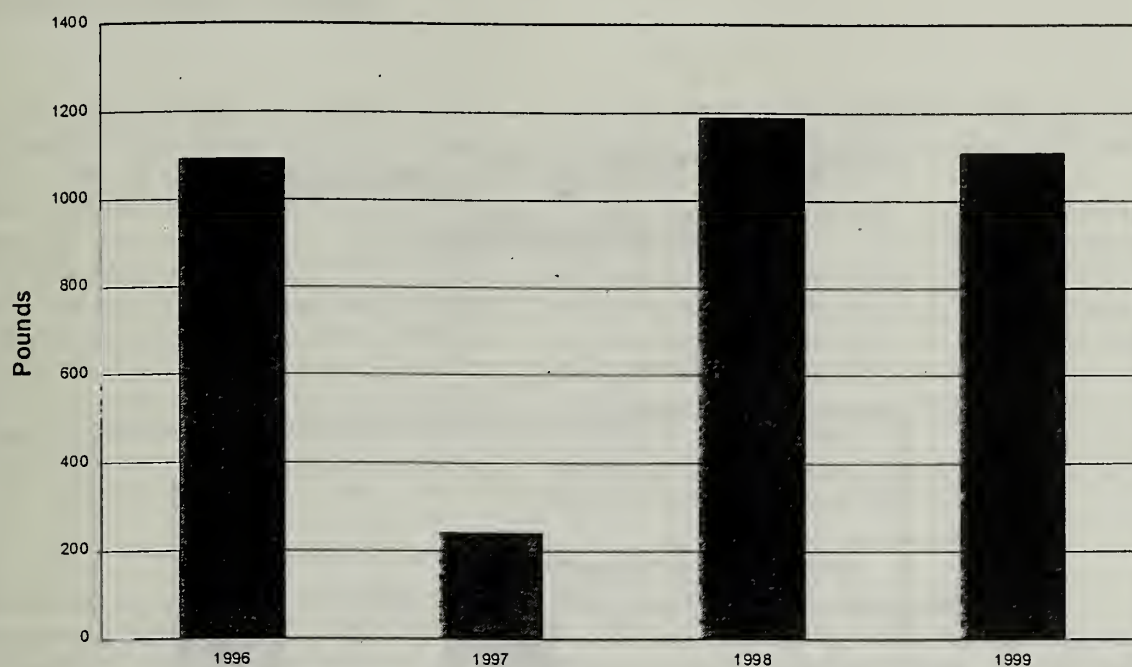
Dept. of Rec/Parks has achieved a 55% reduction in pesticide use in recreation and landscaped areas (golf courses are considered separately).

Trends in Roundup Use Recreation and Parks Department



Gallons of RoundUp: This graph shows the 30% reduction in the use of RoundUp by the Department of Recreation and Parks on all public recreation and landscaped areas. Golf courses are not included in this data but they use very little RoundUp in comparison.

Golf Course Pesticide Use (pounds)

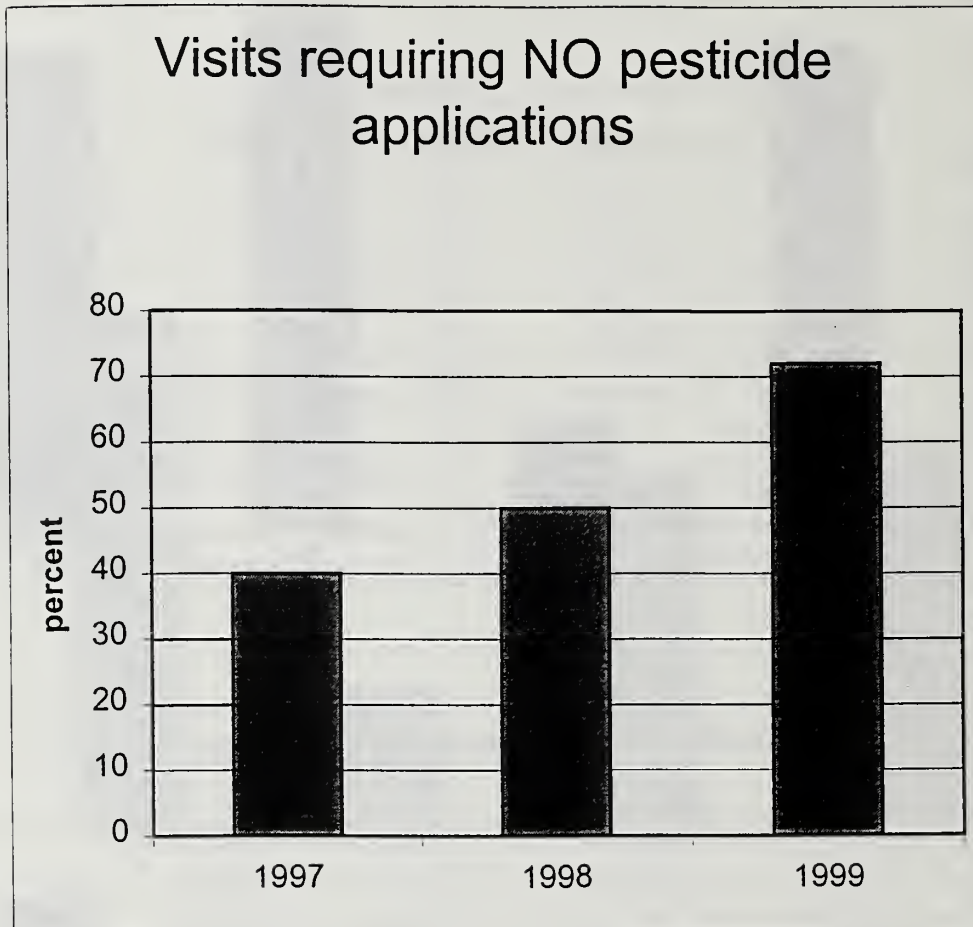


Golf Course Pesticide Use (gallons)



These graphs show that golf courses are fairly flat in their use of dry weight pesticides but are experiencing a dramatic increase in the use of liquid pesticides. These figures do not indicate the relative toxicity of the various products being used.

Trends in Indoor Use of Pesticides



Trends in Indoor Use: this graph shows the progress made in reducing reliance on chemical pesticides inside buildings and structures. In over 70% of visits to city buildings by the pest control contractor, pest control services are performed without the use of

San Francisco's Pesticide Phase-Out

What happens after the law is passed

by Gregg Small and Deborah Raphael

Three years after its passage in 1996, the San Francisco pesticide ordinance has effectively achieved its primary goal — reducing the health and environmental impacts associated with the use of pesticides by San Francisco City departments. The use of the most hazardous pesticides has been reduced to practically zero, the public's right-to-know has increased significantly through the posting of signs prior to and after an application, and public awareness of pesticide problems and alternatives has increased. This article is designed to provide an update on what has been learned over the past three years so that people in other communities can learn from San Francisco's successes and challenges.

The History

On October 8, 1996, the San Francisco Board of Supervisors voted unanimously to pass a cutting-edge ordinance that would significantly reduce the use of hazardous pesticides by all city departments. The policy, among other things, immediately banned the use of pesticides linked to cancer, reproductive harm, and those that are most acutely toxic; increased the public's right-to-know by requiring posting of most pesticide applications 72 hours before and after an application; established Integrated Pest Management (IPM) as the pest management framework for all departments; and, banned all pesticides except for a list of approved pesticides effective January 1, 2000. This policy was the strongest local policy in the nation and has successfully contributed to a movement to adopt similar policies through cities and school districts across the nation.

Why Pesticide Reform Was Needed in San Francisco

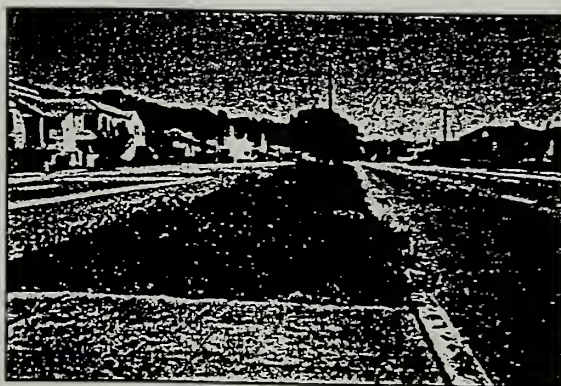
In 1995, staff from Green Corps and Pesticide Watch Education Fund (PWEF) undertook an audit of pesticide use by the San Francisco Recreation and Parks Department (Rec/Parks). Concerned about the public's exposure to pesticides in areas managed by the department, including Golden Gate Park and San Francisco's heavily used public golf courses, as well as potential pesticide run-off into the San Francisco Bay, staff from the organizations poured through reams of pesticide use reports, and found some shocking information. From December 1994 through November 1995, Rec/Parks used over 60 different pesticides, including 26 linked to cancer and 20 suspected of causing reproductive harm. Although

Rec/Parks was thought to be the largest user, with over 80 other departments within the city, their use of pesticides was just the tip of the iceberg.

Like many cities and school districts across the country, San Francisco City staff were caught on the pesticide treadmill. Very few staff were aware of the health and environmental impacts of their pesticide use. In addition, little or no training was offered to encourage staff to seek less harmful pest management practices such as monitoring, beneficial insects, and changing conditions to prevent pest problems from developing in the first place. Successive budget cuts reduced funding for preventive maintenance programs further tightening the grip of chemical pesticides.

Measuring Change: Has the Program Worked?

In terms of reducing product toxicity and risk, San Francisco has achieved concrete successes. All spray applications of pesticides used within public buildings have been replaced with baits, insect growth regulators, exclusion, sanitation, and education. Pesticides linked to cancer and reproductive harm, and those that have been identified as the most acutely toxic, are prohibited from use unless an emergency one-time application is approved by the citywide IPM Coordinator. Broadcast applications of pesticides have been eliminated from playing fields



Flowers planted on a median strip outcompete roadside weeds in San Francisco.

and parks.

Prior to the ordinance, public access to information had been nearly non-existent - even the building managers had no idea what was being applied at their sites though they authorized payment of the pest control bills. Now, a comprehensive system of Integrated Pest Management (IPM) Coordinators and site managers has been created. These individuals are responsible for maintaining records and establishing phone numbers for public access to pesticide use information. Landscape staff are required to scrutinize and justify each application of a pesticide and mandated annual reports to the County Board of Supervisors will hold whole departments accountable for their pesticide use.

Despite these successes, San Francisco's pest management program is not a finished product and still has a long way to go to achieve all of its goals. Many pesticides of concern, including glyphosate (RoundUp™) and several pre-emergent herbicides, continue to be used at relatively high levels. Col-

lecting data about what pesticides are being used remains a challenge. However, changes in behavior begin slowly and build in momentum as each barrier falls.

Integrated Pest Management (IPM): A Good Approach to Pest Management?

Many people are well aware of the abuse of the term IPM over the past decade. Although the term has been used inappropriately by people who continue to emphasize the use of hazardous pesticides, the basis of IPM is sound, and many departments within San Francisco are using IPM appropriately.

IPM, at its core, is about changing pest management practices to prevent problems from occurring in the first place, making the use of pesticides unnecessary. IPM programs require more than simply banning certain pesticides, although this is an important component. They require a paradigm shift within large bureaucracies. Institutional inertia must be overcome, and innovation encouraged. Changes must be adopted in how purchasing decisions are made, products are used, contracts are written, people are trained, information is provided to the public, and how staff at various levels and in various departments work together to find long term solutions instead of the usual short fixes.

While IPM in San Francisco does not mean the elimination of all chemical pesticides, the city's IPM program embraces a new paradigm for city workers around pest management decisions and tactics. City staff are not just replacing one toxic pesticide with another, but are taking the time to determine what is causing the pest problem and identifying the steps needed to prevent the problem from occurring in the future.

Protecting the Public's Right-to-Know

There are two major elements of the San Francisco right-to-know provisions: record-keeping and notification.

Notification: Under the ordinance, nearly all pesticide use requires 72-hour notification before and after application. Generally, city staff who plan to apply pesticides post signs with information including pesticide name, active ingredient, target pest, area to be treated, date and time of application, and who to contact for more information. The notification system has worked well in achieving its goal of providing warning to the public about pesticide use. The primary problem with this system has been vandalism of signs.

The only pesticide applications that are exempted from the prior notification are baits. If baits are used as part of a pest management program, a permanent sign indicating the use of the bait and who to contact for more information, is posted in a conspicuous location within the building.

Record-keeping: Under the ordinance, each department is responsible for keeping detailed information of each pesticide application, including details on the target pest, the name of the applicator, the application equipment used, the type and quantity of pesticide used, and the site and date of the application.

This has turned into one of the more challenging aspects of program implementation. In fact, not one department has been able to provide complete information for its pesticide use for the past three years. There have been two primary barriers to accomplishing this important component of the policy. First, in most departments, pest management has not been centralized or coordinated. This means that many people, from the janitor to an outside pest control company to gardeners, are responsible for managing pests within any one department. Now there are IPM coordinators in each department, which should improve the situation.

The second major problem has been designing an easy-to-use system for tracking records. With multiple departments and multiple staff responsible for pest management within most of those departments, designing a system that is user-friendly and accessible to everybody who needs it has been quite a task.

The first step to addressing this problem was designing a database program to track pesticide use with the software program Access. The database is based on a state mandated pesticide reporting form that each department must submit monthly to the County Agricultural Commissioner's office. Training sessions were given to appropriate supervisors and applicators and, in several cases, landscape staff were outfitted with computers in order to participate. The data system is designed to transmit the pesticide use information via e-mail to the citywide IPM Coordinator's office where a central database is compiled.

However, this data collection program has faced some hurdles. First, the old saying "garbage in garbage out" becomes a real issue when many people in a department are authorized to use pesticides. Staff may not be comfortable with computers and some still do not have workable systems accessible to them. In addition, the program is well-designed to track pesticide use but does not track prevention activities or non-chemical controls such as exclusion and vacuuming. The city is working to expand the database to better reflect the range of options important to an IPM program.

To address the problems with the tracking of pesticide use and pest problems, the city recently designed a computer tracking system and form for structural pest control staff. The form is easy to use and requires pest control staff to note not only pesticide use, but also other pest management practices that they use, including monitoring, beneficial insects, and baits. In addition, all new structural pest control contracts will require timely electronic submission of pesticide uses.

**City staff are taking the time
to determine what is causing
the pest problem and
identifying the steps needed
to prevent the problem
from occurring...**

Coordinating a Large City Program

For a program to succeed in a city the size of San Francisco, effective coordination between city departments is critical. Coordination has worked well and departments are working together on issues such as training, hiring of personnel, and testing of equipment.

The key components to its success have been:

Technical Advisory Committee (TAC): The basic idea of the TAC is simple — bring together the major players involved in implementation of the policy for regular meetings to share information and find creative solutions to challenges.

Within the first few months of the passage of the ordinance, the Director of the San Francisco Department of the Environment, and the San Francisco Agricultural Commissioner, called the first meeting of the TAC. For the past three years, this group has met on a monthly basis. Attendance at these meetings ranges from 15-30 people, and usually includes: the seven major departments within the city who traditionally used the most pesticides;

pest control companies who hold contracts with the city for services; IPM experts; public interest advocates, and staff from the Department of the Environment and the County Agricultural Commissioner's office.

The TAC has provided for regular, productive meetings which help to provide a sense of teamwork, and offers the opportunity for on-the-ground pest managers in different departments to share information and chronicle challenges. It also provides an opportunity to identify shared problems and possible solutions. For example, early in the process, departments recognized a need for increased funding, primarily for staff in some departments and training in all departments. After identifying this need within the group, Pesticide Watch worked with public interest, health, and environmental advocates within the city to successfully lobby Mayor Willie Brown to provide increased funds for these needs.

Pesticide Reduction Coordinator: The City of San Francisco has one full-time staff person who oversees the IPM program for the entire city. This person is responsible for coordinating all elements of the IPM program including development of the approved list of pesticides, data collection and pesticide tracking, contractor oversight, public relations, and training.

The existence of a single staff person accountable for program success is a critical part of any IPM program. The exact qualifications for this position will depend on the program, but certain skills have proven invaluable. The most important is the ability to coordinate and motivate a wide range of people who represent disparate viewpoints, each with their own set of barriers and challenges. The second is a firm understanding of IPM principles and the ability to access tech-

nical information and professional expertise when needed.

IPM Coordinators: As required under the ordinance, each of the 80 departments within the city must appoint one person to serve as an IPM Coordinator. For most departments this "coordinator" is really a contact person. Current IPM educational efforts have focused on the seven "biggest user" departments. Each of these departments has designated several IPM point people and one coordinator. The IPM Coordinators are responsible for data collection and for communication between the citywide coordinator and department em-

ployees. For example, when a particular department experienced a mouse infestation, fact sheets were distributed to the office staff through the department's IPM Coordinator.

Training at All Levels

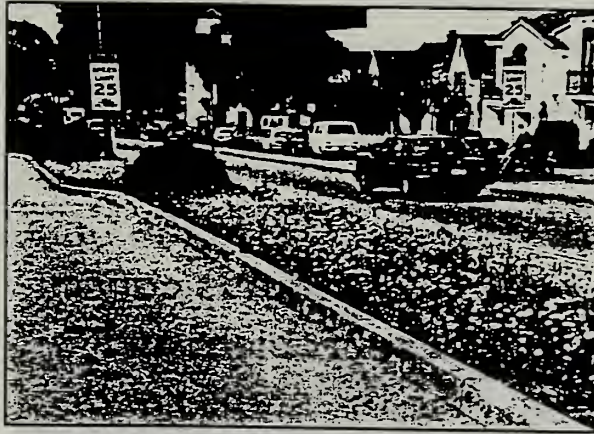
A common theme to most IPM programs is the importance of training. It is often said that all members of an institution must receive training to ensure the success of IPM efforts. San Francisco has demonstrated an on-going commitment to training from the level of the

Department Head to the groundskeepers, custodians, and office staff who usually drive the pest control process by issuing the complaints.

"Non-Technical Training": Working closely together, the office of the County Agricultural Commissioner and the Department of the Environment put together a training program aimed at building occupants, custodians, and site managers. Roughly 17 of these "non-technical" training sessions have been conducted so far. Outside consultants are hired to lead the sessions and a specialized IPM workbook for structural pest control was developed as a companion to the presentations. Participants are taught the basics of IPM including the specific role each individual plays in the pest identification and prevention process. These training efforts have been well received and are given to staff throughout the city including the public hospitals, libraries, Public Works and MUNI (public transit). Training also occurs in the form of presentations at regularly scheduled staff meetings.

Mayor Willie Brown helped to facilitate training of high-level staff by sponsoring a special training for department heads. The training was aimed at improving awareness of the specific requirements mandated by the city's ordinance as well as increasing the high level buy-in necessary for program success. The San Francisco Airport offers an IPM component as part of the regular safety training required of all new employees. Airport staff also developed a training manual to broadly describe the pests commonly found on airport property, as well as some of the exotics brought in by unsuspecting foreign travelers.

Other non-technical training has occurred in the form of fact sheets on the major insect pests, and the development of



Flowers on a median strip in San Francisco.

a web site whose goal is to link interested parties to the myriad of information on less toxic pest control now available on the world wide web. Training can involve a combination of tactics that include written materials and actual control. For example, when the Station Agents (ticket collectors) in the subway stations complained about mice in their booths, the response was two-fold. First, educational materials (fact sheets) were distributed on the habits of rodents and the importance of sanitation and exclusion. Second, station maintenance staff placed traps and installed door sweeps on the bottoms of all booth doors, techniques mentioned as part of the training materials.

Technical Training: In San Francisco, like most other cities, nearly all structural pest control is done by outside contractors while in-house staff perform landscape pest control. Thus training has tended to focus on landscape issues, particularly weed and rodent control. For structural pest control, the applicators are outside contractors, making the bid process, rather than city-sponsored training, the crucial step in ensuring compliance with the IPM ordinance. A discussion of the bid process and working with outside contractors appears below in the section "Outside Contractors."

Technical training of landscape staff consists of presentations and product demonstrations in both large conference-like venues and smaller group workshops. Outside experts are brought in to discuss control issues relevant to landscape maintenance in San Francisco's often foggy and windy climate. In addition, training manuals prepared by outside IPM experts have become a significant tool for communicating control options other than chemical pesticides.

One unexpected consequence of these citywide training programs has been the opportunity for grounds-keepers with similar concerns and challenges to network with their peers across departmental boundaries, something that is very rare in large bureaucracies.

In-house staff were responsible for some of the training materials, like the fact sheets, while experts in the IPM field were contracted to create a variety of manuals and workbooks. The Public Utilities Commission worked with the Bio Integral Resource Center and experts to create a series of workbooks on pests of particular concern to the department. Each workbook walks the reader through an IPM decision making process and offers a number of control options from mechanical and reduced-risk chemicals to prevention and exclusion. Each workbook was part of a hands-on training session. Topics include Gophers, Yellow Star Thistle, Argentine Ants, Gorse, Brooms, and General Vegetation Management. While the Public Utilities Commission (PUC) developed the workbooks for their own staff, they have made them available throughout the city further fostering a sense of interdepart-

mental teamwork in our IPM efforts.

Budgetary Requirements

Limited resources often present the most significant barrier to implementing an IPM program. IPM programs emphasize long term solutions to on-going problems, yet most budget processes reflect short-term fixes. Training, equipment purchases, and additional labor all cost money and department heads do not give priority to pest control in their allocation of existing resources, given competing needs and budgets.

In San Francisco, roughly 35,000 employees fall under the ordinance. In addition, the IPM ordinance affects not only the 49 square miles of land within San Francisco's city and county borders, but also the city-owned property in seven surrounding counties, covering hundreds of miles.

San Francisco is utilizing an effective system to fund the IPM program. Even departments, identified as "big users" of pesticides, were each asked by the Mayor to transfer \$17,900 to the Department of the Environment for program coordination and development. This money is being used to fund the position of the citywide IPM Coordinator as well as to fund training, expert consulting fees, and materials for all seven departments and outreach to the remaining 70 city departments.

Other funding sources include a start-up grant awarded to the County Agricultural Commissioner's Office by the Environmental Protection Agency and private grants used to fund

specific projects. In addition, individual departments have drawn upon existing budgets to implement specialized training and pilot projects.

It is still too early to tell whether the short-term start-up costs will result in long-term cost savings for the city in terms of real dollars. It is likely that it will save the city very difficult to quantify but very real benefits including decreased costs for health care for poisonings and clean-ups, increased morale of city staff who are proud of an effective program, and decreased costs in pesticide purchases.

The Year 2000 List: Developing a List of Approved Use Pesticides

Under the ordinance, all pesticides are banned from use by San Francisco City departments effective January 1, 2000, except for a list of approved use pesticides. Compiling this list has been one of the major challenges in implementation. The intent of the ordinance was never to ban all pesticides. Because the definition of pesticides is so broad, many materials and methods that are defined as pesticides are critical components of an effective pest management program, including some safer oils, biological controls, and others. Rather, the

**IPM is about changing
pest management
practices to prevent
problems from occurring,
making the use of
pesticides unnecessary.**

intent of the list is to contain only those pesticides that are low risk to humans and safe for non-target pests.

In the first year of the ordinance, all acutely toxic category I, labeled "Danger," (as defined by EPA) pesticides and those identified by government agencies as linked to cancer and reproductive harm were banned. By the end of the second year, all acutely toxic category II, labeled "Warning," pesticides were banned except under specific exemption by the citywide Pesticide Program Coordinator. Now a four-step process has been established to compile a list that not only defines which pesticides may be used on city property but also sets parameters for how those pesticides are used.

Step 1 - Assembling a potential pesticide list (completed): Each city department was asked to submit a list of pesticides they wished to be considered for inclusion on the approved list, excluding the most hazardous pesticides that had been eliminated by previous bans.

Step 2 - Scientific review (in process): The city will assess the ecological impacts and human health concerns of each pesticide requested for use. A scientifically defensible evaluation tool was needed to conduct such a review. Philip Dickey of the Washington Toxics Coalition has developed an excellent system for assessing the potential effects of many commonly used urban pesticides, which is being used in both the City of Seattle and King County, Washington. San Francisco will run each of the "desired" pesticides through this rigorous analysis. Once the analysis is complete pesticides will be grouped according to the risk and hazard factors.

Step 3 - Combining science with need: A small committee composed of community members, city staff, and public interest advocates will be charged with reviewing the scientific analysis and sorting pesticides into tiers of relative toxicity (see below). The committee will need to weigh the environmental and human health impacts with the need for a particular pest management tool. Available alternatives will be considered as well as mitigating factors such as self-contained bait stations or the ability to exclude public access, and hence reduce exposure, on a golf course. The public will be invited into the process through publicly held meetings.

Step 4 - Final adoption: The San Francisco Commission on the Environment will then make the final decision on what will be included on the approved list. The list will be revisited every six months to determine if new, safer pesticides should be added and if some more hazardous pesticides can be dropped or their use further limited.

At the end of this process, a three-tier system for using pesticides will be established:

Allowed Products: This list will include products that are considered non-toxic, such as beneficial insects and bio-

logically-based pesticides, as well as those defined by the city as reduced risk. Products on this list will likely include insecticidal gels and containerized baits, some soaps and oils, organic acids, and inorganic salts like borates.

Limited Use: This list will include products that are of possible environmental and public health concern but whose use is required under the financial constraints and/or performance requirements of building and landscape maintenance. The list will dictate the specific circumstances under which a product may be used. For example, Roundup Pro™ will most likely be found on this list. However, use of this product would be limited to such situations as cracks in asphalt where use of a scraping tool would only expand the weakened areas of the surface and so increase the available area for future weed establishment.

Requiring Exemptions: Some products are considered to be of significant enough concern that their use must be restricted to emergency situations. For example, a fungal out-

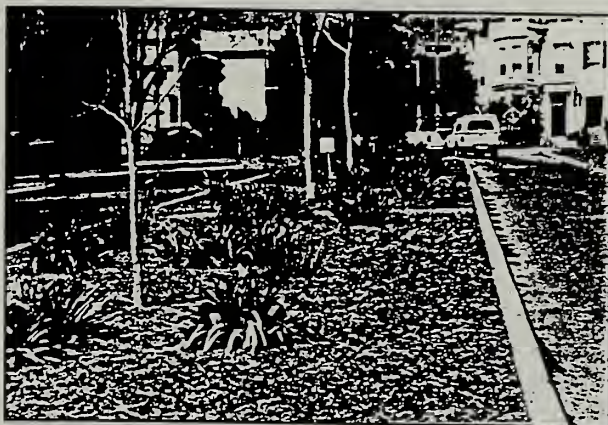
break on golf course greens can require a swift solution that is usually chemically based. For a product on this list to be used, a written request must be submitted to the citywide Pesticide Program Coordinator for approval. There currently is a debate within the Technical Advisory Committee (TAC) about whether this list should actually include specific pesticide products or whether it should simply be the process for exemption requests.

Compiling this list and developing a protocol has been ex-

tremely challenging. City staff have made tremendous strides in eliminating the use of many highly hazardous pesticides and have altered their practices to reduce the need for using pesticides in many other cases. Yet many still believe that they should have access to pesticides that Pesticide Watch and other public interest advocates have serious concerns about, including glyphosate, the active ingredient in Roundup™. The challenge facing the subcommittee charged with assembling the list can not be underestimated. IPM programs must balance the need for tools to cover a wide range of pest control problems with the imperative responsibility of protecting human health and the environment.

Outside Contractors and Tenants on City Property

Ensuring compliance with an IPM ordinance means making sure all in-house staff are on board as well as any outside contractors who are hired for pest management purposes. We have discussed in detail the mechanisms for oversight of in-house staff, largely training and reporting. Outside contractors, usually structural pest control operators, can offer a special challenge when procurement of these services is spread across a large number of departments or even individual sites



Mulch effectively curbs weeds on a median strip in San Francisco.

throughout a city. In San Francisco, a citywide pest control contract has greatly aided consolidation of the oversight of both procurement and contractor performance. No department may hire a pest control contractor outside of the citywide bid. This type of restriction is quite common in municipal purchasing and so most departments have little trouble understanding the contracting procedure and following it closely.

Several sample contracts for IPM services are available (City of Santa Monica, National Capitol Region (Washington, DC), Santa Clara County) and San Francisco will be refining its contract in the first part of 2000. An effective contract must specify which pest management methods are allowable and preferable for each target pest. In addition, the contract must address pest-proofing as either the responsibility of the contractor or the contracting department. For example, is caulking or screen repair a reimbursable use of the pest control contractor's time? Finally, the contract must spell out the reporting requirements of the IPM program. Most contractors are not used to filling out detailed reporting forms for their clientele or submitting monthly summaries of pesticide products used. If these elements are viewed as important, they must be spelled out in the contract document.

Oversight of the contractor's performance is best achieved by tracking customer satisfaction along with the pest monitoring and control activities performed at each site. In large institutional settings, such as cities and school districts, the Quality Assurance Form (QAF) becomes the key communication and oversight tool for the IPM Coordinator. The QAF lists the number of traps, monitors, bait stations, etc. in place at a given site and documents any lapses in sanitation or structural deficiencies contributing to pest infestations.

One particularly successful program is at San Francisco's International Airport, which includes roughly 2.5 million square feet of building space on 7,000 acres, and is visited by about 40 million passengers a year. Pest control on such a large scale is no small feat. The Airport's IPM Coordinator receives the QAF's generated by the pest control contractor throughout the airport. In addition, each week the Coordinator performs a detailed monitoring tour of the entire airport facility. Combining the information on the QAF with his own observations, the IPM Coordinator generates a "Monitoring Form" detailing problem areas that require immediate attention. This form is forwarded to the Head of Environmental Services who then designates individual tasks to the appropriate maintenance staff members. Because of this system, rat infestations were curtailed by placing lids on all the trash cans at an open field used by the public for viewing airplane landings and takeoffs. Also, increased street sweeping has reduced the need for herbicides or labor for mechanical methods to

control weeds growing in curb areas.

San Francisco faces a tremendous challenge in implementing the IPM ordinance within city-owned properties that are leased by private tenants. Both the Port and Airport house hundreds of private tenants (each airline and shipping company is considered a private tenant). The IPM ordinance does specify that when an individual's lease comes up for renewal, the tenant must comply with all aspects of the ordinance. We hope to develop a tenant education program some time next year.

Oversight of individual tenants will most likely be on a complaint basis. In terms of outside contractors, the final challenge will be to implement the IPM ordinance for city operations that occur in non-city owned buildings. Again, the lease is the point of opportunity to establish pest management related requirements.

San Francisco has demonstrated an on-going commitment to training from the level of the Department Head to the groundskeepers, custodians, and office staff...

It Takes A Team to Succeed: Acknowledgements

The authors of this article are only two voices in a large collection of individuals who are responsible for the IPM program in San Francisco. The authors would like to acknowledge the following individuals for their dedication and leadership in crafting and implementing San Francisco's IPM program: Dave Frieders and Jay Seslowe of the San Francisco County Agricultural Commissioner's Department, Al Hom and Beryl Magilavy of the Department of the Environment, California State Assemblyman Kevin Shelley and San Francisco County Supervisor Leslie Katz, and current Director of the Department of the Environment, Francesca Vietor. We would also like to acknowledge the many members of the TAC who have shown strong leadership in taking new approaches to pest management within their departments.

Gregg Small is the Executive Director of Pesticide Watch and Pesticide Watch Education Fund and the President of the Beyond Pesticides/NCAMP Board of Directors. Gregg has served on the San Francisco Technical Advisory Committee since its inception. Gregg can be reached Pesticide Watch, 450 Geary Street, San Francisco, CA 94102, 415-292-1488, greggsmall@earthlink.net, or www.pesticidewatch.org.

Deborah Raphael is the Pesticide Reduction Program Coordinator for the Department of the Environment, City of San Francisco. Deborah can be reached at the Department of the Environment, 1540 Market Street, Suite 160, San Francisco, CA 94102, 415-554-6399 or debbie_raphael@ci.sf.ca.us.

One of the most successful elements of the San Francisco ordinance has been the change in pest management practices that have occurred in a number of city departments. Knowing that many of the traditional chemical tools were no longer available, many staff have experimented with new and innovative ways to reduce their reliance on chemical pesticides. Below is a summary of some of these changes.

Weeds

Annual Flowerbeds in Golden Gate Park: The Rec/Parks Department eliminated the use of pre-emergent herbicides in the highly visible flowerbeds outside the park's conservatory. First, staff experimented with solarization, a technique that failed in this site because the over-spray from sprinklers kept the plastic wet which cooled the soil below. The gardeners have since developed a successful system where the empty beds are watered and allowed to sit for two weeks to let weed seeds germinate. A flamer is then used to kill the seedlings as they surface. The system works so well that only occasional hand weeding is required to maintain the bed once the annuals are planted.

Public Utility Commission: On the steep slopes that surround one of the city's remote reservoirs a herd of goats is being used to clear brush including Poison Oak and Yellow Star Thistle to reduce fire hazard. Robin Bruer, the department's IPM Coordinator has contracted the services of the goats along with two dogs and a herder for 18 months.

The herd will circle the reservoir three times creating an open growth pattern in the vegetation. Using goats to clear vegetation will both reduce the risk of fire and protect the water supply from potential pesticide contamination.

A series of pilot projects from installing weed barriers to an intensive gopher and mole monitoring and trapping program have all reduced the need for chemical controls. In one heavy brush area, a fire road is being maintained by a set of experimental plots to test various mowing regimes and dozer blade removal techniques (in combination with and without pesticides). The project goal is to convert the vegetation pattern within the fire access area from dense brushland to perennial grasses and wildflowers using the most efficient and chemical-free methodology.

Golf courses

Recreation and Parks: San Francisco owns and operates a number of golf courses both within our county limits and in neighboring areas. Golf courses have traditionally been the most difficult settings to manage without the use of chemical controls such as herbicides and fungicides. The supervisor for Sharp Park and Golf Course, John Farley, has proved a willing partner in the search for less toxic management practices. John and his staff well understand that healthy turf means disease resistant turf and that means less of a need for pesticides. They are experimenting with the use of slow-release organic fertilizers and various aeration methods to im-

prove turf health. In addition, the staff have set up a monitoring system to track weather conditions at various points in the course as well as the presence of disease and prevalence of weeds such as English Daisy. John hopes that such detailed records will allow him to better understand when a disease outbreak can be waited out and when a chemical control is needed. Staff use mulch to prevent weeds in flowerbeds and select plants sturdy enough to handle the nearly continuous stream of salt air that blows in from the ocean adjacent to the course. John's experiences on the golf course will be translated to turf areas throughout the city's neighborhood parks.

Cockroaches

MUNI (public transit): "There's no roaches in these coaches" is the word from Victor Lee and the maintenance division overseeing the "rolling stock" (buses, trains, trolleys, etc). Several years ago, buses were routinely sprayed with insecticides, whether insects were present or not. Now improved sanitation has been combined with a baiting program and the results have proved a success. Baits are applied only twice a year so the cost of pest control has been drastically reduced and the buses are filled with happy monitors (i.e. the passengers) who would definitely let staff know if cockroaches were riding along with them.

Roadsides

Public Works: Median strips are a very common challenge for an IPM coordinator. For beautification, many miles of these narrow planted areas are cropping up but rarely are resources planned for their maintenance and upkeep. Applying herbicides to medians carries an additional risk for the applicator - moving vehicles. The spray operator, Ralph Montana, charged with maintaining San Francisco's medians, and a great many other areas as well, decided to try planting wildflowers in several areas that seemed heavily prone to weed infestations. Three mixes of wildflowers were selected to match local climatic conditions and the resulting blooms require little maintenance. In addition, any volunteer weeds blend in with the less manicured look of the flowers and so no herbicides have been needed to remove them.

In addition to the examples cited above, outside vendors are invited to present information on their "alternative" products and train San Francisco staff to implement pilot studies to determine the efficacy of these technologies within the constraints of our microclimate and bureaucracy. Products that have been tested include "flamers" and hot water systems for weed control, corn gluten meal based products, and several predatory insects released as a means of biological control in our greenhouses and nurseries. The city is now exploring opportunities for working closely with local research institutions to act as an experimental demonstration site for new reduced risk technologies and products.

— Gregg Small and Deborah Raphael

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Department of the Environment

Integrated Pest Management Program
2001/2002 Annual Report

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**Integrated Pest Management Program
Annual Report 2001/2002**

TABLE OF CONTENTS

Program Report.....	1
<i>Pesticide Use Data:</i>	
Citywide.....	9
Department of Recreation and Parks.....	25
Public Utilities Commission.....	34
Department of Public Health.....	43
Department of Public Works.....	52
San Francisco International Airport.....	61
Port of San Francisco.....	70
Department of Transportation.....	79
Future Directions.....	88
<i>Attachments:</i>	
A. Reduced Risk List of Pesticides	
B. Pesticides Added and Removed from 2000 Reduced Risk List	
C. Technical Advisory Committee Meeting Agendas	
D. San Francisco IPM Conference Agenda	
E. Green Flamer Safety Guidelines	
F. Rodent Summit Agenda	
G. IPM For Public Agencies Agenda	
H. Getting Past Pesticides Brochure	

Integrated Pest Management Program Annual Report 2001/2002

Debbie Raphael, Toxics Reduction Program Director
Robin Breuer, City Toxics Reduction Coordinator
Julie Bryant, Integrated Pest Management Associate

Introduction

The City of San Francisco's Integrated Pest Management (IPM) Program has continued to meet a valued goal of reducing the amount and toxicity of pesticides used during 2001-2002. This past fiscal year proved to be another period for successful, cooperative, and innovative pest control and prevention. City staff received training, an Approved List of reduced risk pesticides was updated, new technologies implemented, and IPM Specialists from across the state attended the IPM Conference.

Recently, the Department of the Environment (DOE) merged with the Solid Waste Division, expanding staff, resources, and environmental expertise to create new opportunities for service to City Departments. The DOE has been conducting site tours, reviewing IPM Demonstration plots, and assisting City staff in finding resources such as experts, data collection methods, latest research, and alternative technologies.

Below is a summary of the progression of San Francisco's Integrated Pest Management Program from July 2001 through June 2002. The following includes information on both citywide IPM and specific information on each of the City's 7 "big users" of pesticides. The pesticide use data summarized in the graphs of this report shows trends in pesticides from 1996 through the end of 2001.

Program Recognition

The City and County of San Francisco received an IPM Innovators Award from the California Department of Pesticide Regulation for their innovation and excellence in IPM.

Approved List

Under the terms of the IPM Ordinance a list of "reduced risk" pesticides must be reviewed annually and approved by the Commission on the Environment. Only the pesticides on this list may be used on City property unless an exemption is granted by the DOE. The reduced risk pesticide list is meant to be a dynamic document and will be reviewed on an on-going basis to incorporate new pesticide products and to remove unneeded ones. The Reduced Risk Pesticide List of April 2001 is included as Attachment A. As Attachment B demonstrates, eight pesticides were removed from the 2000 list and only one pesticide, with a Tier 3 hazard rating (least toxic), was added.

Data Collection and Analysis

A continued measure of the success of the City's IPM program is the frequency with which pest problems can be resolved without the use of any chemical controls. New data shows that the majority of structural (i.e. in and around buildings) pest control performed

by the City's pest control contractor, PESTEC, is made up of various prevention, monitoring, physical, and mechanical methods as opposed to chemical control (see page 11). In fact, 82% of these visits in 2001 did not require application of a pesticide. This data not only shows that PESTEC uses chemicals as a last resort, but also that pesticide data collection has improved to track non-chemical methods of pest control. The ratio of chemical to non-chemical control methods more accurately reflects the City's success in implementing Integrated Pest Management.

Contract Development

All structural pest control is conducted by outside contractors except in the Department of Recreation and Parks. The past fiscal year, DOE worked with the Finance/Purchasing Department to include specific language and expertise for the new Request For Proposals (RFPs) and Contracts. Experience in IPM implementation will be weighted heavily as well as the capacity to supply DOE with up-to-date pesticide use data for each site. Representatives from departments such as Public Works, Public Health, MUNI, Airport, Police, and Fire were brought into the contract development process and will also be part of the selecting a contractor.

Training /Conferences

One key component of all IPM programs is the on-going training for City staff at all levels. DOE staff have been collaborating with other City Departments to organize, facilitate, and promote a variety of training opportunities. All training events and conferences are free of charge to participating departments and are funded from the DOE IPM budget.

Technical Advisory Committee (TAC) Meetings: Each month a Technical Advisory Committee Meeting convenes to exchange information, discuss current pest control techniques, and representatives from the seven "big user" departments meet to discuss implementation of the IPM program. Participants include departmental IPM coordinators, safety and environmental compliance staff, pest control contractors, independent IPM experts, and community members. The City Toxics Reduction Coordinator from DOE chairs these meetings and sets the agendas (see Attachment C).

Topics have included guest speakers on the following:

- July 2001-Pigeons, Animal Care and Control
- August 2001-EcoSmart Technologies, Reduced Risk Products and Infra-Red Weeders
- September 2001-West Nile Virus, San Mateo Mosquito Control District
- October 2001-Field Trip to Clorox Technical Center
- November 2001-Pesticide Related Resolutions and Legislation Wood Utility Poles, Arsenic Treated Lumber
- December 2001-Review of the Role of the Department of the Environment in IPM
- January 2002-No Meeting (IPM Annual Conference)
- February 2002-Pest Control In Asia
- March 2002-Live Removal of Honey Bees at Pilarcitos, San Mateo County

- April 2002-"A" Rated Weeds, California Department of Food & Agriculture and Pigeon Abatement at Laguna Honda Hospital
- June 2002-IPM at the Presidio (Then and Now)

San Francisco IPM Conference: This annual event was held on January 29, 2002. The conference was filled to capacity, 250 people attended. A wide variety of people attended from all over the state including landscape professionals, gardeners, laborers, IPM experts, school district representatives, pest control advisors, and university professors. Attendees received 6 Continuing Education Units issued by the Department of Pesticide Regulation, which are required to maintain state licenses. At the end of the conference a panel made up of various conference speakers answered questions and discussed topics of concern from the audience. The panel discussion proved to be successful and well received as many members of the audience participated by asking questions and sharing experiences.

The agenda for the conference was based on input from members of the TAC as well as suggestions from IPM advisors (see Attachment D). Topics included the following:

- Inert Ingredients in Pesticides
- Evaluating Pesticides
- State of California Healthy Schools Act
- Weeds as Indicators
- City and County of S.F. Experiences in IPM
- IPM for Interiorscapes
- Sudden Oak Death

San Francisco Board of Supervisors member, Aaron Peskin, presented several City departments and individual staff members with Environmental Service Awards in recognition of their efforts to reduce the use of pesticides on City property. Recipients for the year 2002 were:

- San Francisco International Airport-Fred Ota for excellence in landscape
- Department of Recreation and Parks-Rhododendron Del Team for excellence in restoration and landscape
- MUNI-Leo Martinez for excellence in Pest Management
- Life Time Achievement in IPM-Sheila Daar
- Excellence in IPM Service-Luis Agurto
- San Francisco Public Utilities Commission, Millbrae Facility-Mike Reed for excellence in Landscape IPM
- Dedication and Leadership in IPM-Jay Seslowe

Pesticide Safety Training and Flamer Workshops: DOE worked with several departments to offer pesticide safety training to their staff serving as pesticide applicators. DOE staff work closely with various departments to bring in outside experts as speakers and to arrange for professional credit issued by the Department of Pesticide Regulation. DOE developed a safety card with operator instructions for City employees trained to use flamers (see Attachment E).

Training sessions held during fiscal year 2001-2002 have serviced many people including participants from the following departments:

- Rec./Parks 116 participants
- PUC 45 participants
- DPW 12 participants
- Airport 12 participants
- Public Health 13 participants

Additional training was held for safe flamer use and storage, April 17 and 25, and May 15, 2002. The training included hands-on demonstration of flamer equipment and operation as required by the San Francisco Fire Marshal. DOE developed a safety card with operator instructions for City employees trained to use flamers (see Attachment E).

Sustainable Parks Workshop Series: These trainings were designed specifically for San Francisco City gardeners, especially Recreation and Parks employees, however other Department's employees were also in attendance. DOE will continue to work with the Departments to identify new training needs and opportunities. Topics discussed at the workshops included:

- Sustainable Parks Training Kick-off-Scot Medbury, Arboretum; Dan McKenna, Assistant Superintendent; Lisa Wayne, Natural Areas Program; Amy Vincent, Sustainability Department, Presidio Trust
- Permaculture Concepts and Overview-Penny Livingston, Director of the Permaculture Institute of Northern California and partner of the Sustainable Living Designs Company
- Best Plants for Drought-tolerance, Soil Health and Habitat Needs-King Sip, Golden Gate Park Nursery Manager
- Ecological Restoration Conference
- Healthy Soils-Lou Truesdell, President of American Soils Products, Inc.
- Native Soils
- Compost Tea and Other Pilot Projects-Phil Rossi, Recreation and Parks IPM Coordinator and Christa Conforti, Presidio Trust

Rodent Summit: The National Park Service with assistance from DOE staff, received a grant from the University of California to sponsor a full day training on managing urban rodent populations (see Attachment F). The rodent seminar was held at the Presidio, February 27, 2002 and attended by more than 60 participants from the San Francisco Bay region. Presentations included:

- San Francisco's Rodent Control Program-Jack Breslin, San Francisco Department of Public Health
- The Urban-Rural Interface-Ron Keith, Marin County Vector Control Program
- Rodent Identification and Biology-Dr. Desley Whisson, UC Cooperative Extension
- Rodents Disease and Ectoparasites-Curtis Fritz, California Department of Health Services

- Rodent Proofing-Bruce Badzik, National Park Service and Ron Keith, Marin County Vector Control
- Trapping-Dr. Desley Whisson, UC Cooperative Extension
- Bait Selection-Greg Howald, Island Conservation Ecology Group
- Baiting and Bait Boxes-Arthur Slater, US Berkeley Pest Management Services
- Rodent Borne Disease, Handling and Cleanup Procedures-Robin Breuer, San Francisco Public Utilities Commission

Statewide IPM Coordinators Workshop: Based on the success of San Francisco's IPM Coordinators Workshop in previous years, the state of California's IPM Program sponsored a two day workshop, bringing together public agency staff and University researchers. DOE staff worked closely with State IPM Project staff to present this training opportunity (see Attachment G).

Community and Regional Outreach

Web Site: The IPM Program Web Site can be accessed through the City's Web Page as well as through the DOE web site at www.sfenvironment.com. The IPM portion of the website allows easy access to documents produced by the program and a wide array of pest-related information. The website can be used to assist the City Departments and the public with new developments on such topics as Africianized Honey Bees and the West Nile Virus.

Interdepartmental Coordination: In order to facilitate partnerships between departments, DOE Staff have created the San Francisco Pesticide Working Group. The group will be meeting and planning interdepartmental projects. Representatives from other existing City programs are members of the group. One City program, the Water Conservation Program addresses water and pesticide use for landscape professionals. Another program, the Pesticide Partnership is a PUC program aimed at the resident by placing in-store information on less toxic pest control at selected retail outlets. Also, the PUC works with the San Francisco League of Urban Gardeners to train master gardeners. The Natural Areas Program out of DPR trains volunteers to remove non-native plants to avoid the need for chemical controls.

Harding Park Golf Course Renovation and IPM Plan: DOE worked with the Recreation and Parks Department to ensure pesticides were managed properly at Harding Park Golf Course. Initially, developers wanted to use an excessive amount of pesticides in the renovation of the existing golf course. Finally Recreation and Parks decided to manage the renovation and ongoing management of the course themselves. In response to concerns over potential pesticide runoff into Lake Merced, Recreation & Parks presented to the Commission on the Environment the Harding Park Resource Protection Plan in April 2001. It became clear that there was a need to plan for the future of the golf course in order to ensure that pesticide use would be minimized throughout the lifetime of the course. As a result, DOE, Recreation & Parks, a team of specialists and consultants are developing a Harding Park Golf Course Integrated Pest Management Plan.

San Francisco Flower and Garden Show: The IPM Program sponsored and staffed a booth at the San Francisco Flower and Garden Show March 20-24, 2002. The booth highlighted alternative pest control strategies as well as the IPM successes of City Departments. Approximately 5,000 visitors were reached at our booth. Additional opportunities for community outreach will be explored especially through the SF Pesticide Working Group.

Rain Policy: DOE held a meeting to develop a rain policy, which included City Staff, community members, and outside experts on pesticide application. This policy outlined procedures and precautions for use of pesticides during the rainy season to minimize potential drift or runoff.

Written Materials: DOE has been developing individual Fact Sheets on specific pests and alternative control methods. The DOE and PUC cooperatively worked together to produce a color brochure on the City and County's IPM Program. The brochure highlights some of the techniques City Departments employed to find alternatives to pesticides (Attachment H).

Exemptions

The Pesticide Ordinance states that the DOE has the responsibility of reviewing and granting exemptions for using pesticides not listed on the Reduced Risk Pesticide List. Exemptions are granted for the control of pests that City Departments have tried alternative methods to control, but need the use of chemical products not included on the approved list. Exemptions may be granted as a one-time event, to knock down an unplanned out-break because of weather conditions, increased habitat availability or food supply. Most often exemptions are granted for the use of new reduced risk pesticides until such time as they can be added to the approved list.

The DOE granted the Department of Recreation & Parks exemptions during 2001-2002 as follows:

<i>Date</i>	<i>Location</i>	<i>Pest</i>	<i>Pesticide</i>
02/05/01	Golden Gate Rose Garden	Enhances Soil Food Chain and Plant Vigor	Companion
4/16/02	Golden Gate Park	Exotic Weeds	Roundup Prodry

Departmental Needs

Port -The Port has an extensive leasing department and DOE Staff developed language to ensure inclusion of IPM language into all new leases. A follow-up or enforcement plan will need to be developed for these and other similar City-owned properties that are privately maintained.

Public Works-The Department of Public Works has internally reorganized staff. DOE will work with their new staff members to review their Department IPM plans and goals. In addition, DOE will work with the DPW Urban Forestry program to achieve IPM goals.

Recreation and Parks-The Recreation & Parks Department has been working very hard towards the opening of the remodeled Conservatory. Several challenges the DOE has been working with Recreation & Parks staff on the year include, Harding Park Golf Course Renovation and IPM Plan, creation and use of compost tea, and chipper bark use. The DOE will continue to assist Recreation & Parks staff to implement IPM strategies.

Department of Public Health-Laguna Honda Hospital has been actively using IPM during the pre-construction phase of remodeling. A coordinated IPM and Green Building effort will continue through out the construction and post construction phases.

MUNI-Coaches and facilities have incorporated IPM techniques in identifying pests and in choosing control alternatives. DOE will collaborate with the IPM coordinator to develop an IPM plan for MUNI facilities. The pigeon problem is severe in many facilities. DOE funded an analysis of the problem using the expertise of Arthur Slater. MUNI needs to develop a timeline for completion of the report.

PUC-The PUC used a herd of goats for grazing weeds around City reservoirs and on steep Rights of Ways. Two alternative technologies were also tested. Thermal treatment was employed to a wooden watershed residence for control of wood boring insects. A weed barrier cloth was installed as an IPM Demonstration plot for weed control along the Sunol facility fence line. DOE will continue to identify alternative technologies and assist in IPM Demonstration plots.

Departmental Progress

While all City departments are covered by the IPM Ordinance and are mandated to have Pest Management Plans on file with the Department of the Environment, the focus of staff efforts have been on the compliance of the "big seven" departments. Pest control for all other City departments is performed by outside contractors. The graphs in this report reflect an ongoing commitment to from San Francisco City Departments to reduce the amount of pesticides on City property and show how amounts and number of applications have changed over time.

Data Collection And Analysis - Measuring the success of an IPM program is a complex task. Pounds of pesticides used do not tell the whole story since they ignore the toxicity of the pesticides and do not account for increases in the number of buildings or outdoor acres maintained. The goal of an IPM program is to reduce both the amount and the toxicity of pesticides and to emphasize prevention and non-chemical controls.

San Francisco utilizes a system for evaluating the toxicity of pesticides developed by Dr. Philip Dickey of the Washing Toxics Coalition (www.sfenvironment.com). This system allows the City to look beyond the signal word and acute toxicity and instead evaluate

pesticides for such factors as chronic effects (i.e. cancer, reproductive harm), environmental effects (i.e. persistence, bioaccumulation, mobility, water quality), and non-target effects (i.e. impact on wildlife, bees).

Using these criteria, products were grouped into tiers with Tier 1 being the most toxic, Tier 2 as products of medium toxicity, and Tier 3 as least toxic. It is interesting to note that many of the products from Tier 1 carry a signal word of "Caution" (least acute toxicity). This illustrates the problem with relying on the signal word on a pesticide product label to select pesticides in an IPM program. Because this system was not in place until 1999, many of the products used before that time were not evaluated by Dr. Dickey and have no tier assignments. Thus the data tracking the various tiers reflect only the trends from the last three years.

It is important to note that graphs showing the overall use of pesticides citywide and for individual departments exclude the products Bio-Weed and Suppressa. These two products are made up wholly of corn gluten meal, a food product that appears to act as a pre-emergent herbicide when used in large enough quantities. Because this product must be used in the 100's of pounds including it in the data for total pounds of pesticides used greatly skews the results. The use of these two products is accounted for in other graphs. These corn gluten meal-based products have been deemed impractical for the use on City property and are no longer in use as part of the IPM program.

Citywide Progress in Pesticide Reduction

Trends in Amounts Used:

Structural Pest Control: As described in preceding text, the majority of structural (i.e. in and around buildings) pest control performed by the City's pest control contractor, PESTEC, is made up of various prevention, monitoring, physical, and mechanical methods as opposed to chemical controls. In fact, as the following graph illustrates, 82% of these visits in 2001 did not require application of a pesticide.

Overall Pesticide Use: As shown with the "Citywide Pesticide Use" graph the number of applications since 1996 has increased by 345%, while the amounts in liquid and dry pesticides has decreased by 21% and 83% respectively. This data shows that the applicators are moving away from large, broadcast applications of chemicals, to smaller, targeted applications. In addition, there has been a steady and noticeable decrease in the amounts of liquid chemicals used since 1996. The decrease in pounds was not as significant, it is important to note that that rodenticides accounted for about 75% of the use in 2001. As shown in the following Rodenticide Use graph, there was a big increase in rodenticide use from 2000 to 2001 by about 1300 pounds. The increase in 2001 was due to the addition of catch basins and sewers for treatment by the City's pest control contractor. When rodenticides are removed from the data, Citywide use actually declined by 53% compared to the year before.

Judging from the data it seemed that pesticide decreases are generally leveling off and the decreases from the first three years were greater than the last three. The use of RoundUp products is more complicated. The increase in dry formulation is attributed to use by the Public Utilities Commission. There is a significant decrease in the use of liquid formulation Citywide. The City may not be able to gain further reductions in the pesticides total amount of pesticides used without additional resources. The DOE and other Departments hope to achieve further decreases in amount and toxicity by testing alternative products, continuing to educate end users, and implementing various trainings and evaluations.

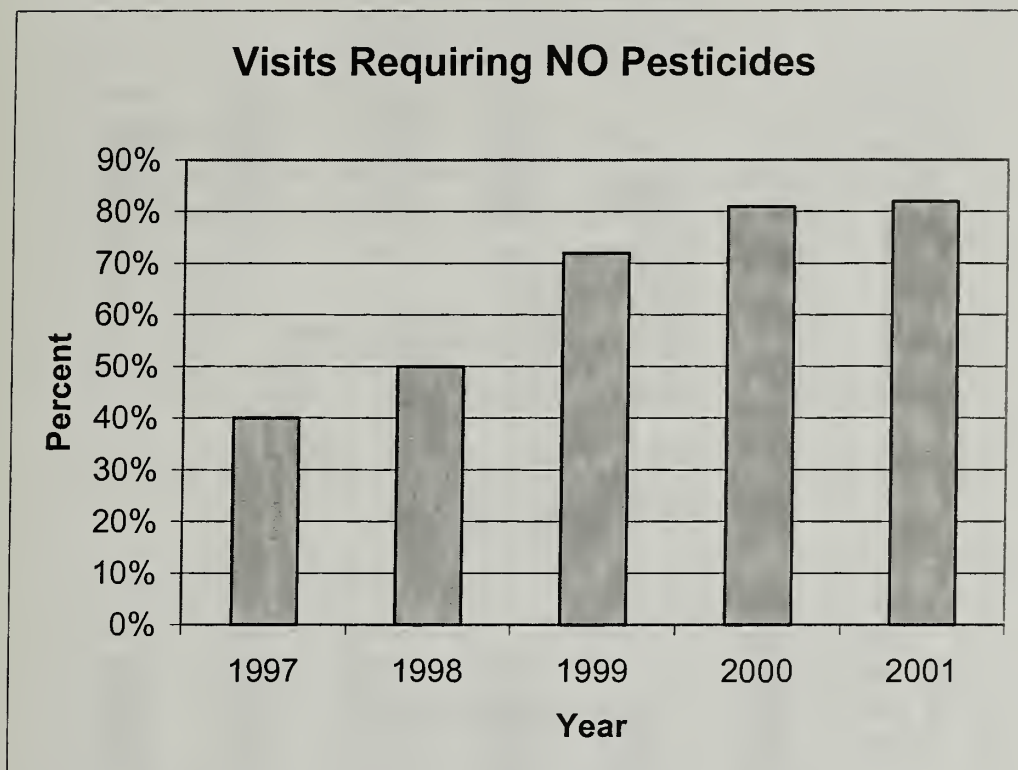
Many pesticide products generate concern with citizens because of toxicity or abused use. Among these, are pesticides such as RoundUp, Diazinon, and Chlorpyrifos. San Francisco has eliminated the used of organophosphates (Diazinon, and Chlorpyrifos) and has experienced a 91% decrease in the use of liquid RoundUp products.

Trends in Toxicity: The graphs demonstrate that the City is moving away from the most toxic pesticide products and is instead choosing products that are safer for the environment and public health. The use of products labeled with the signal word of Danger (greatest acute toxicity) has been totally eliminated on city property. Dry products labeled as Warning have decreased by 92% and liquid have decreased by 88%. The trend remains the same with pesticide products labeled as Caution as their dry and liquid numbers have decreased by 11% and 81% respectively.

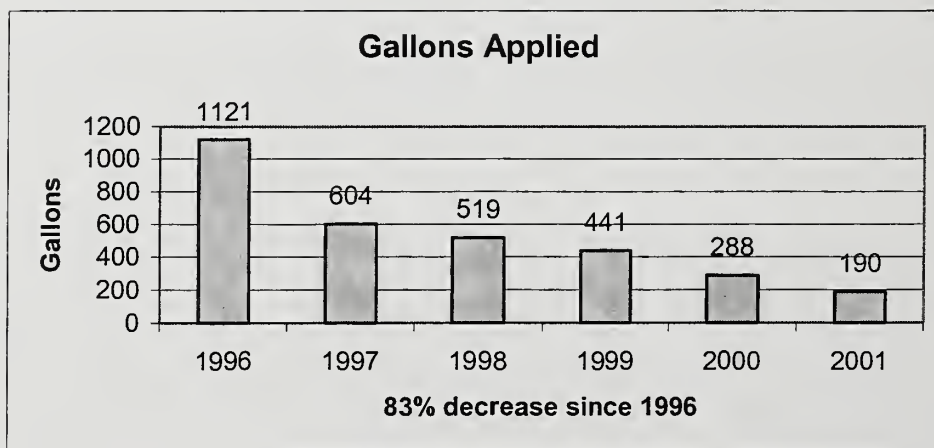
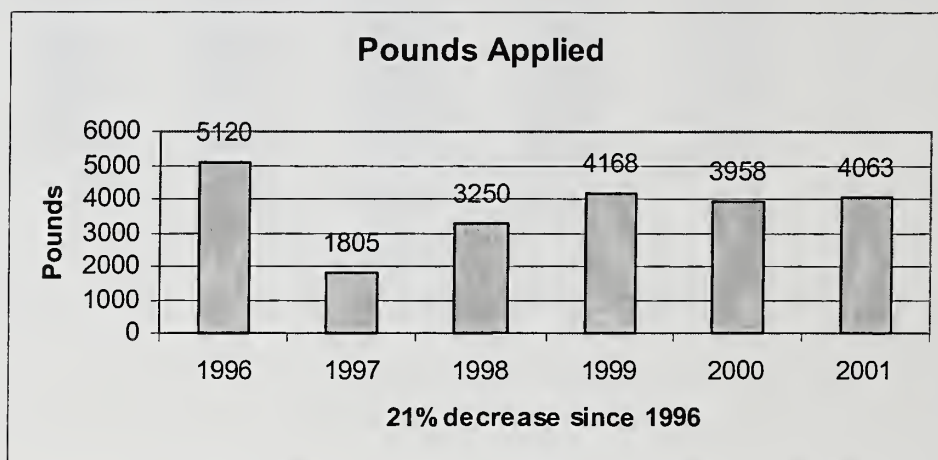
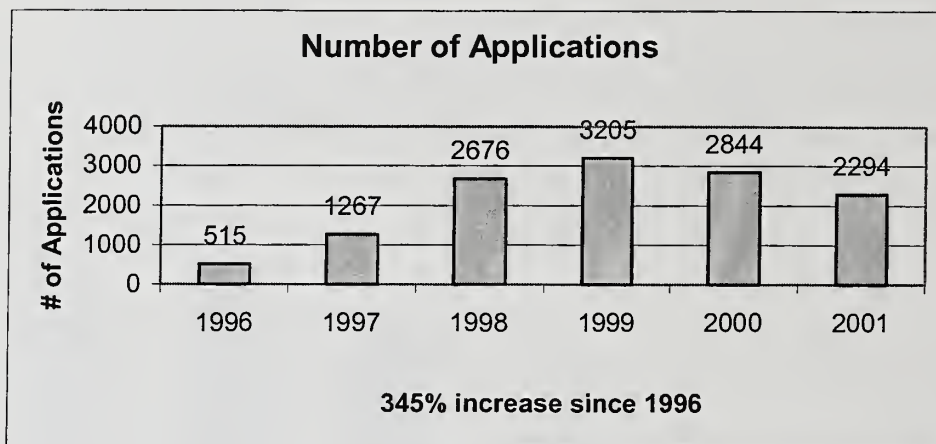
More significantly, however is the decrease in the *Tier 1* pesticide products. This categorization, developed by Dr. Philip Dickey, takes into account chronic, environmental, and non-target effects, whereas the signal word is only a measure of acute toxicity (see report at www.sfenvironment.com). With this in mind the City has shown a reduction in *Tier 1* products by 59% in dry amounts and 70% in liquid amounts. The dry *Tier 2* products have increased but the liquid has decreased by 54%. Finally, dry *Tier 3* pesticide products have decreased by 91% while liquid *Tier 3* products have increased by 84%. This dramatic decrease in pounds is due to the discontinued use of Bioweed and Suppressa. These, extremely heavy corn gluten meal products were deemed ineffective. Such increases in liquid *Tier 3* products shows that Departments are testing and using safer, reduced risk, alternative products over traditional, more toxic, ones.

One interesting measure of program success is to look at the percent of overall applications and amounts that use the least hazardous (*Tier 3*) products rather than absolute amounts of these products. The graph on page 24 shows that the percent of these low risk applications is fairly constant but the amounts being used are steadily increasing. While this trend is exciting it is important to note that *Tier 3* products represent only 6% of the overall dry use and 25% of the overall liquid use. Clearly there is room for improvement in the use of these lower risk, *Tier 3*, products.

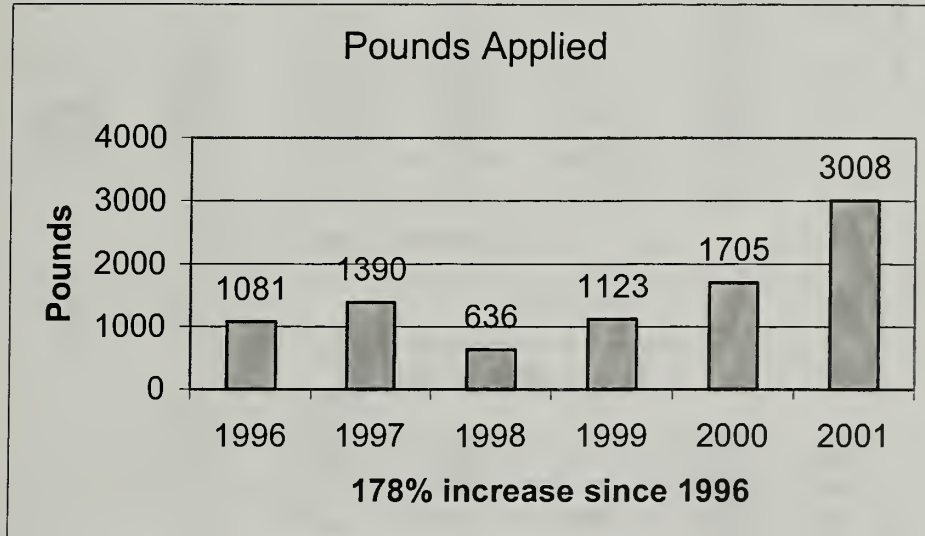
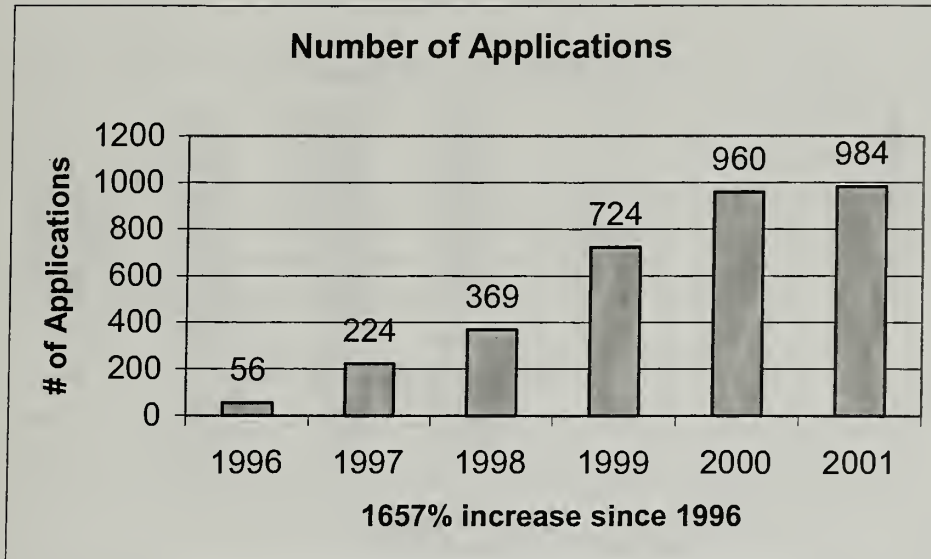
**Trends in Structural Pesticide Use
(Not Including Recreation and Parks)**



Citywide Pesticide Use (Excluding Bio-Weed and Suppressa Use)

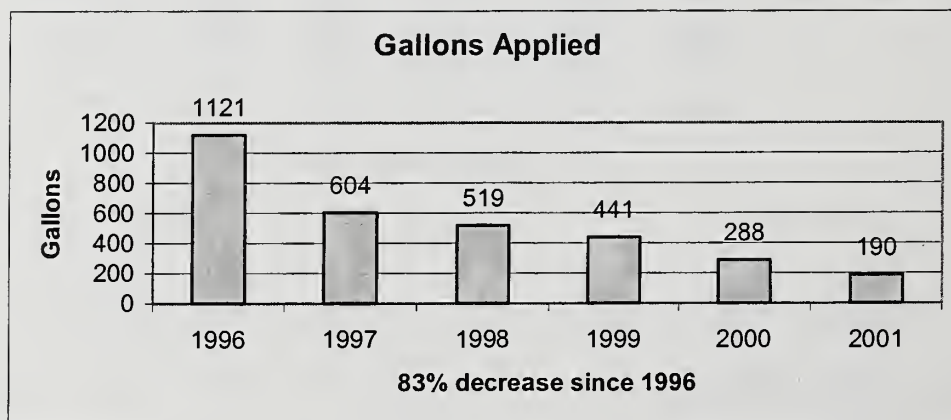
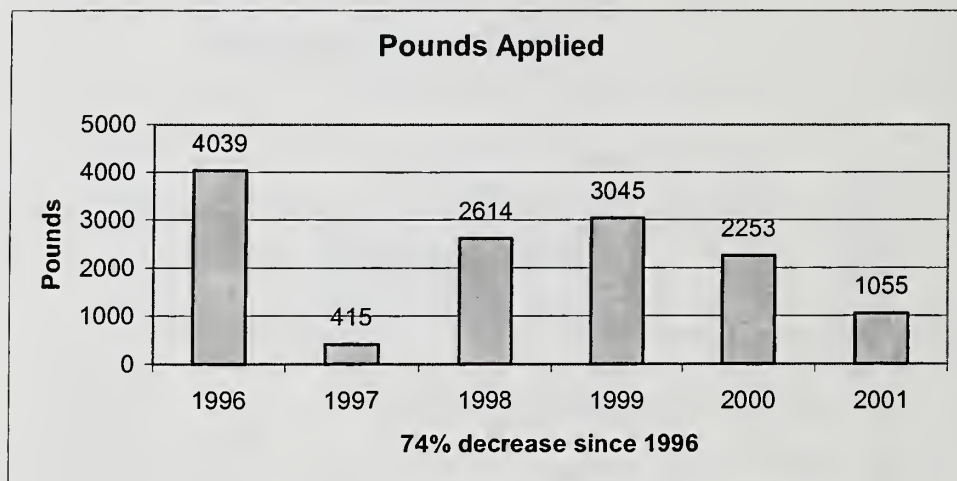
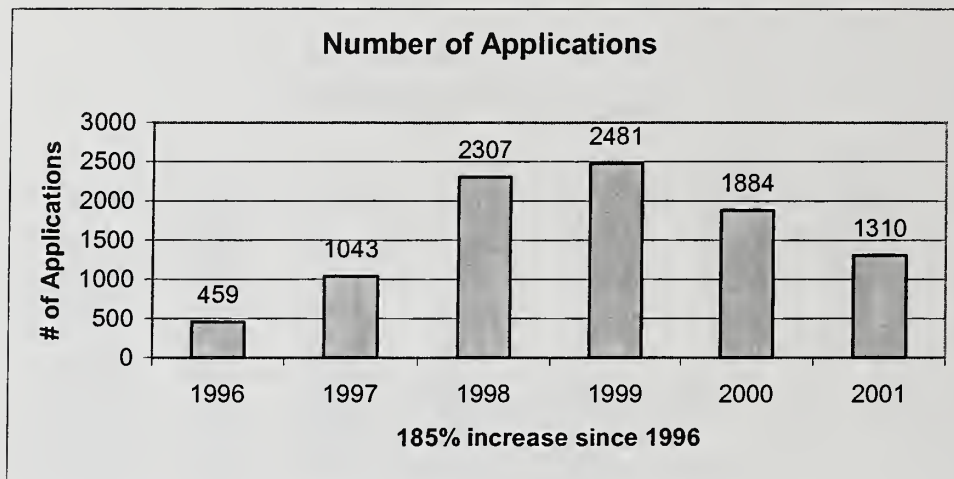


Citywide Rodenticide Use

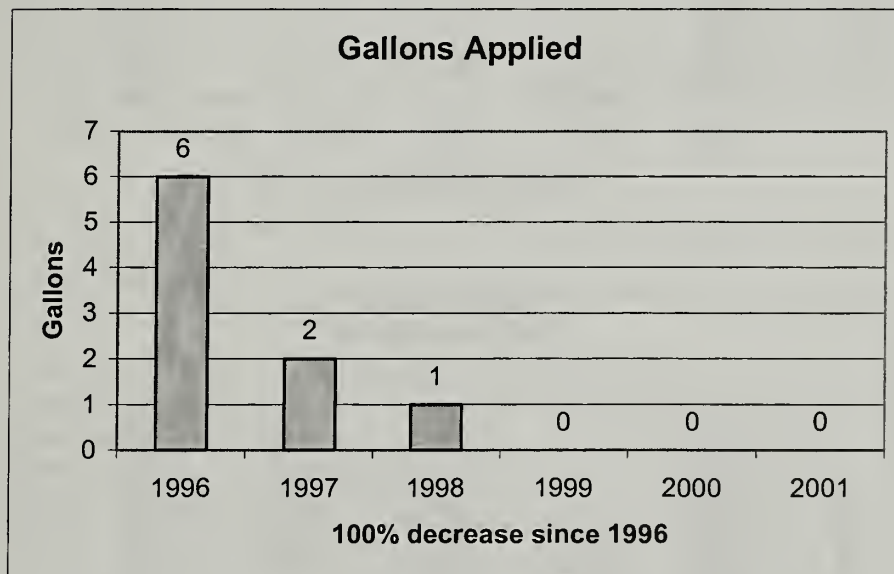
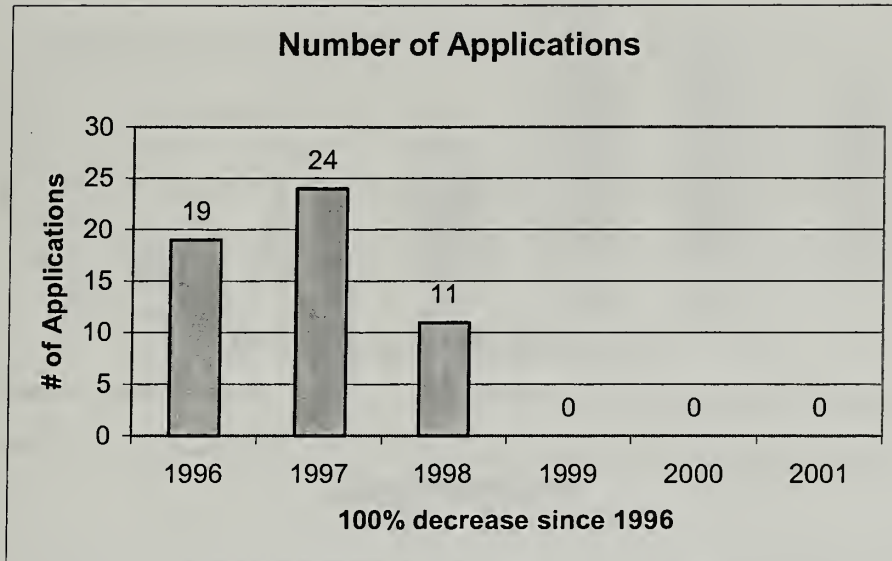


No Liquid Pesticides Reported

Citywide Pesticide Use (Excluding Bio-Weed, Suppressa and Rodenticide Use)

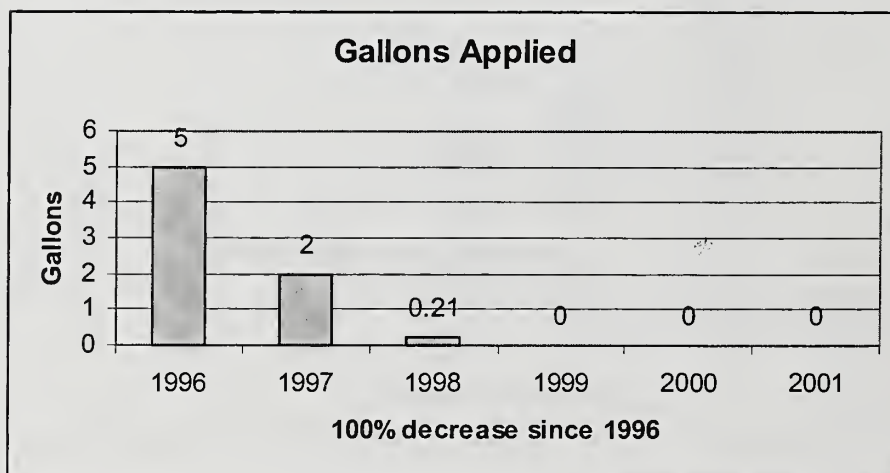
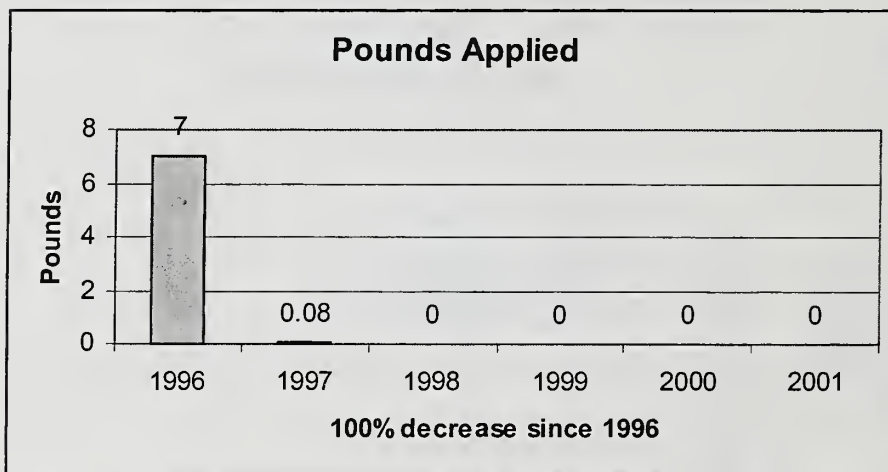
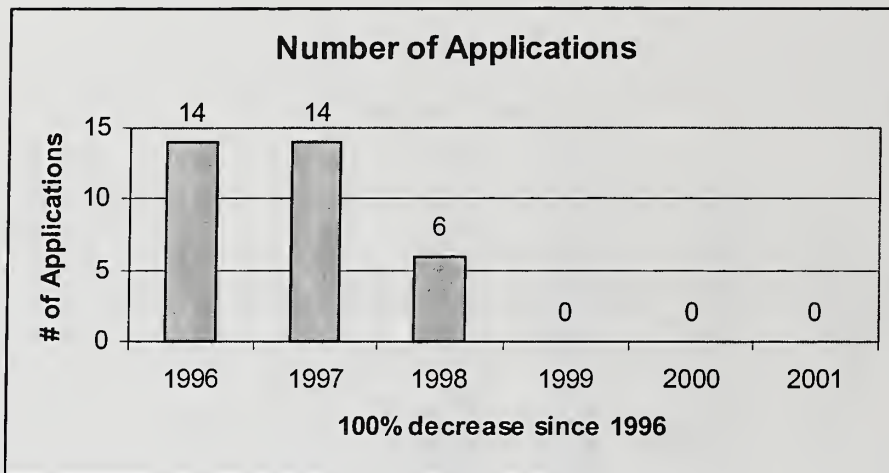


Citywide Diazinon Use

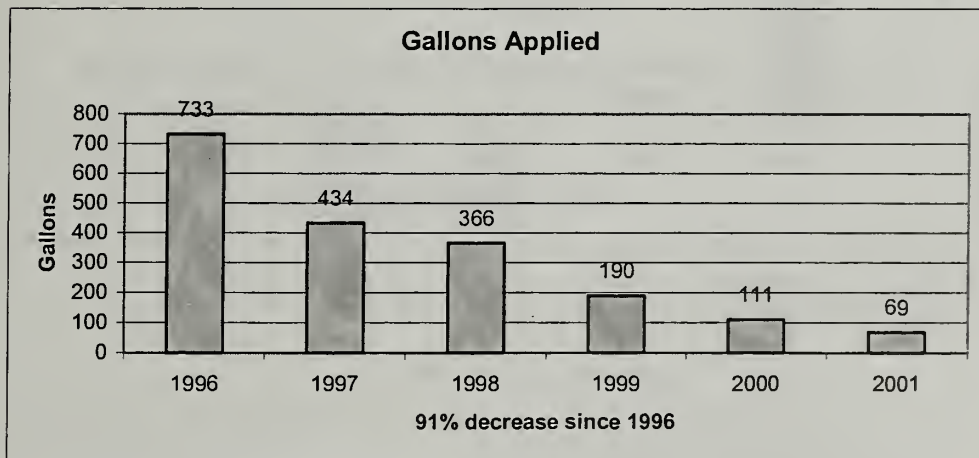
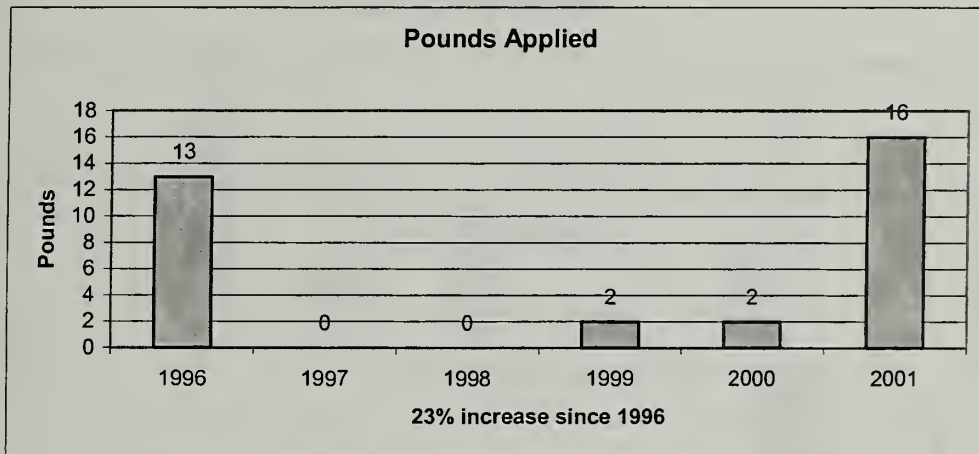
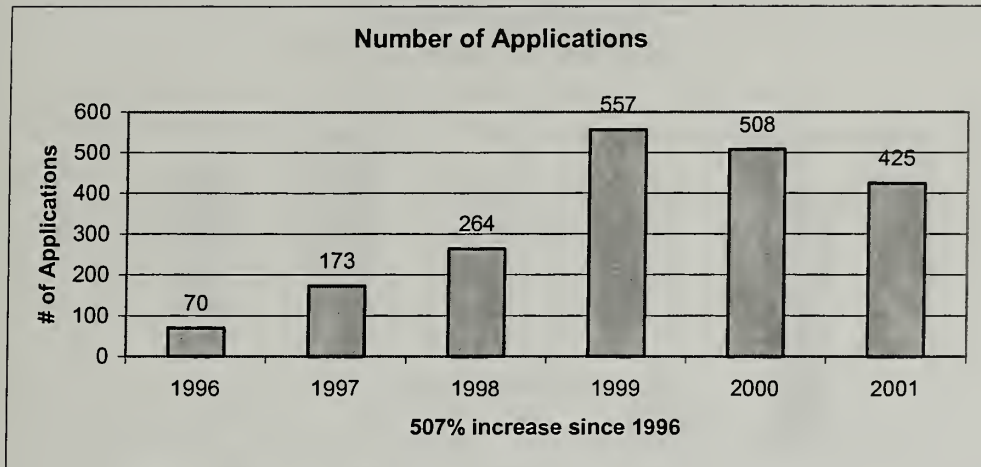


No Dry Products Reported

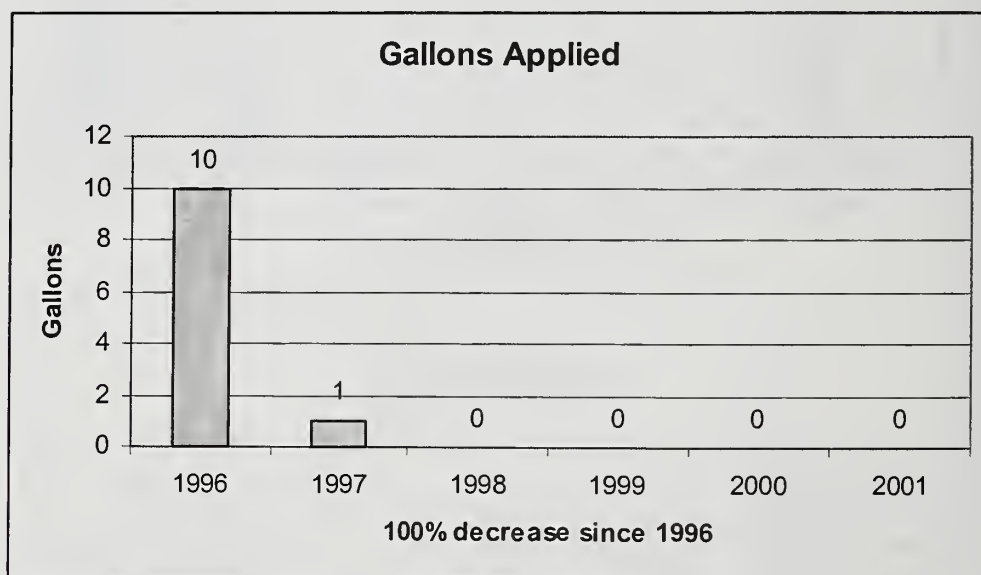
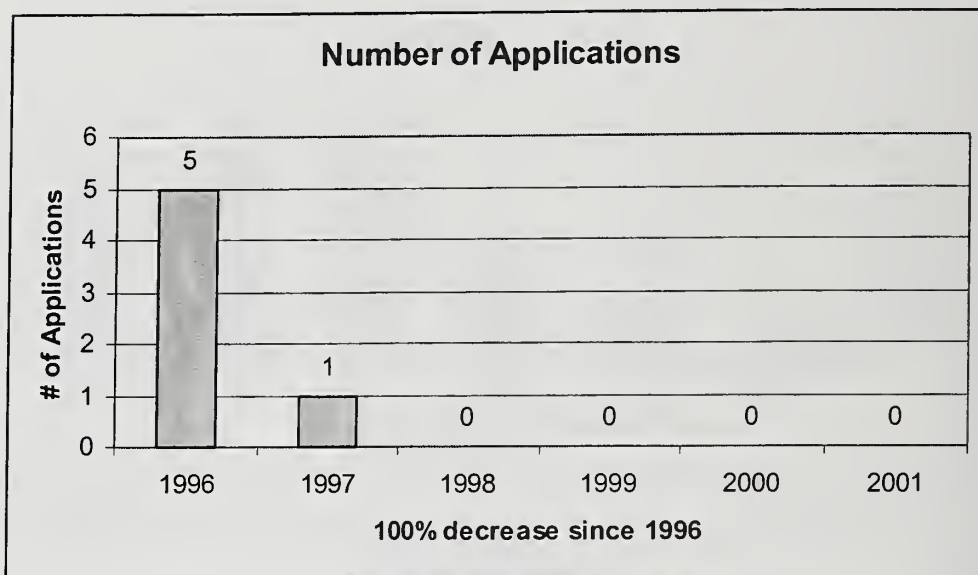
Citywide Chlorpyrifos Use



Citywide RoundUp Use



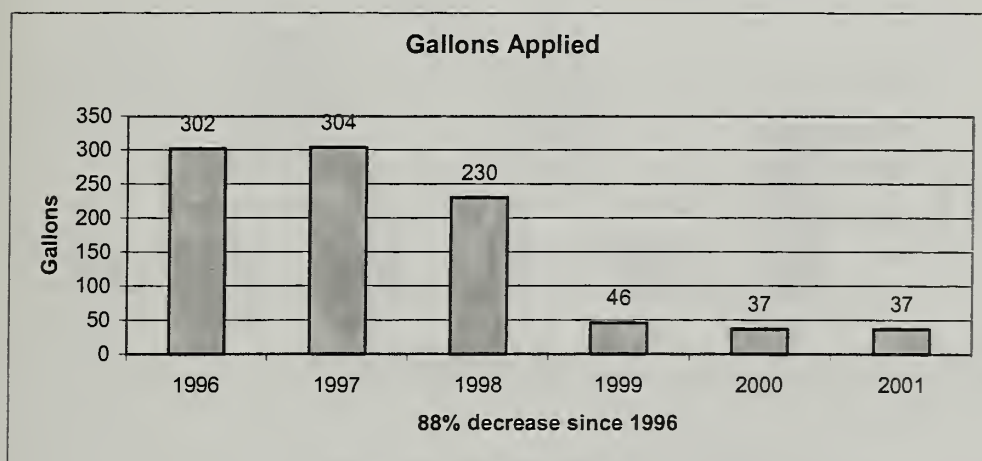
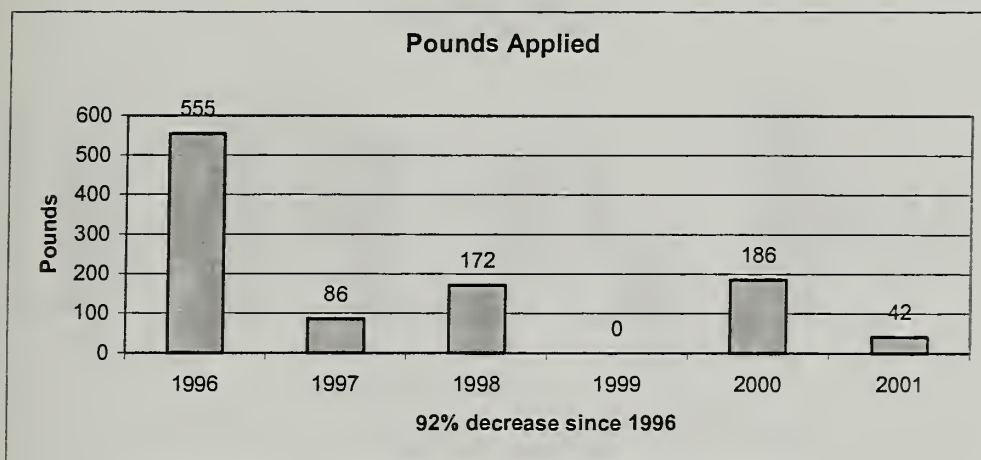
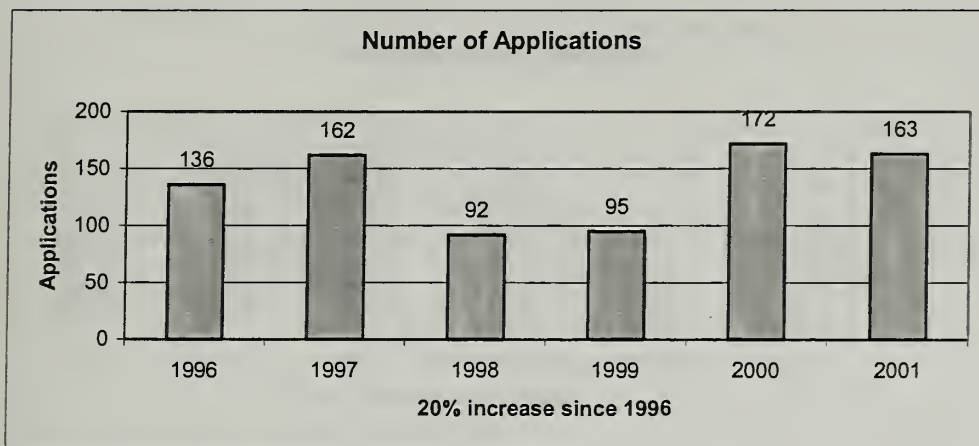
Citywide “*Danger*”* Products Used



No Dry Products Reported

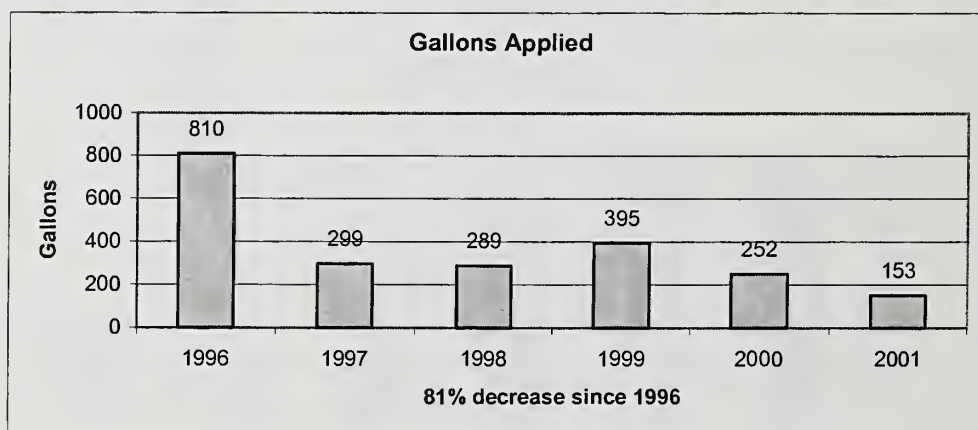
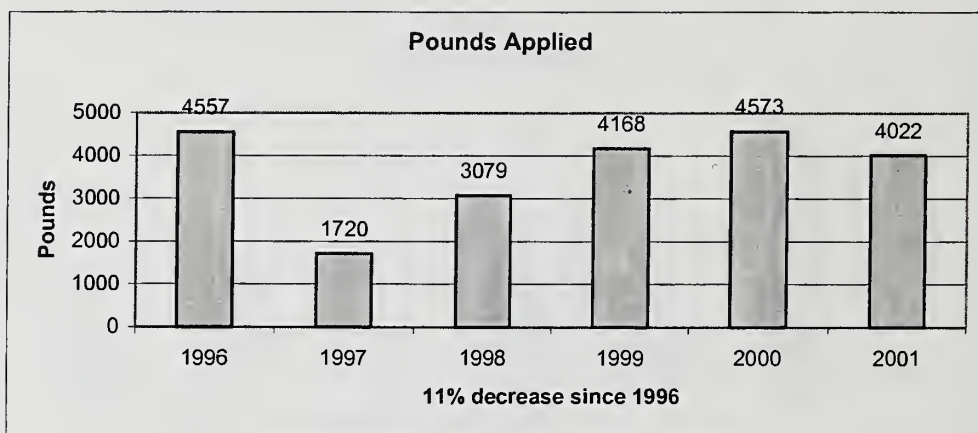
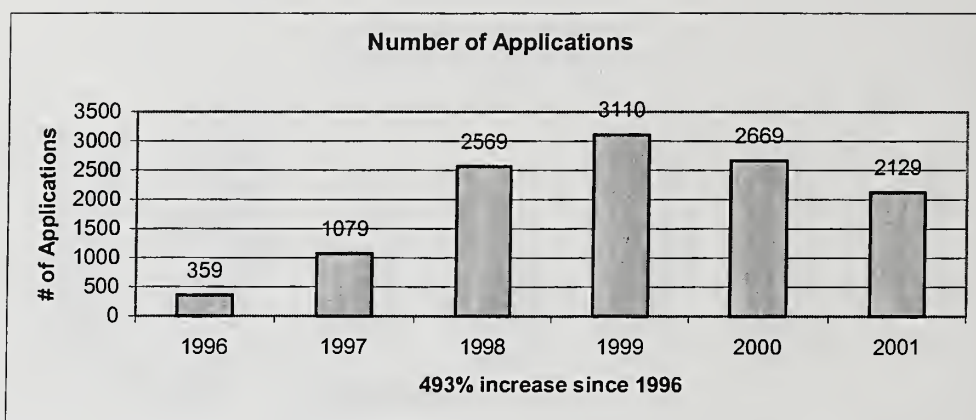
*Danger refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

Citywide “Warning”* Products Used



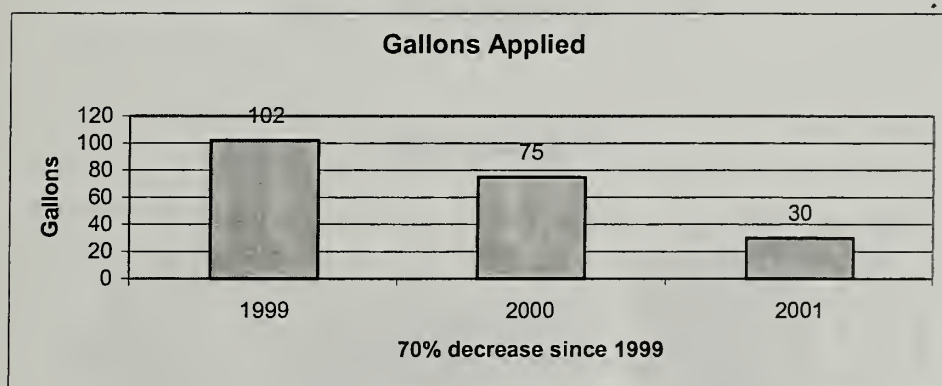
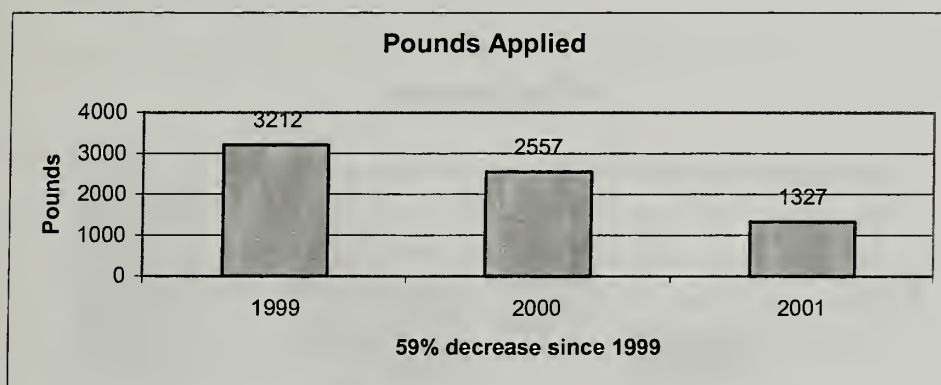
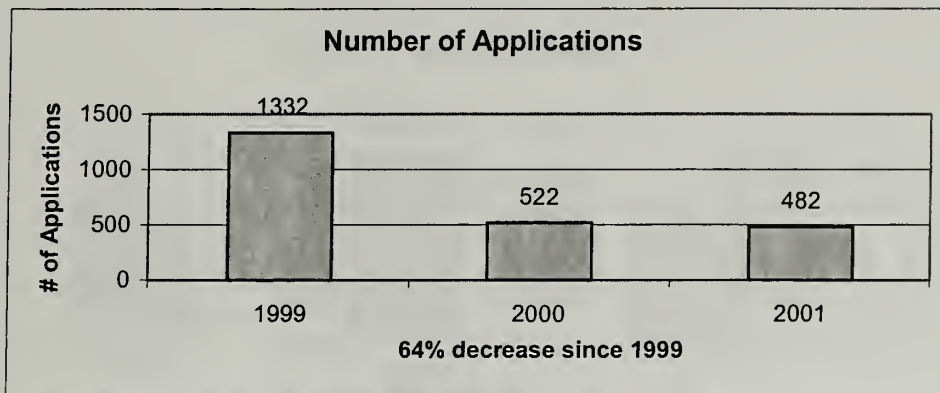
*Warning refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

Citywide “Caution”* Products Used



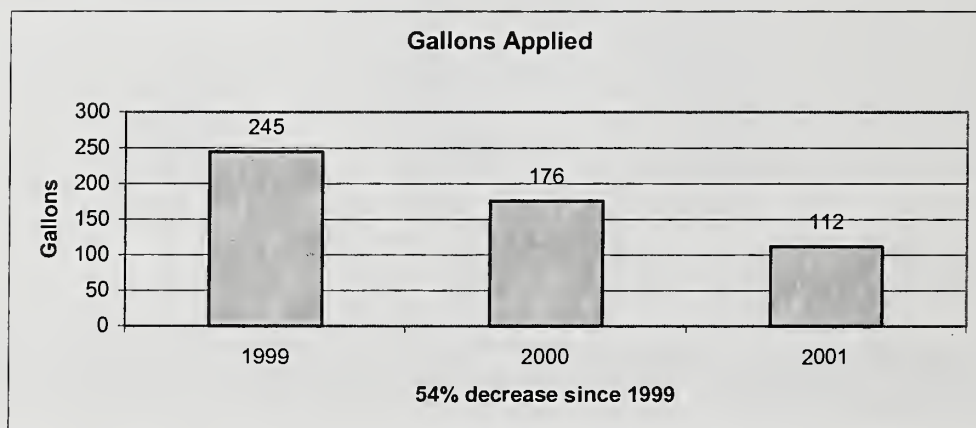
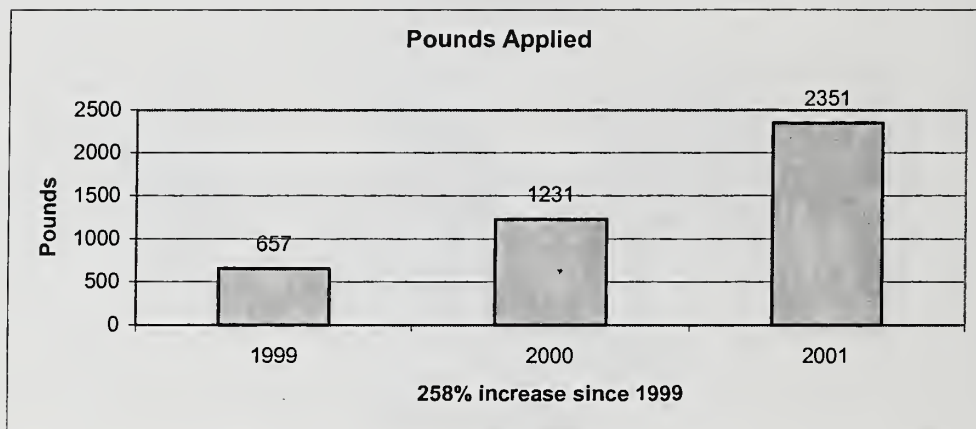
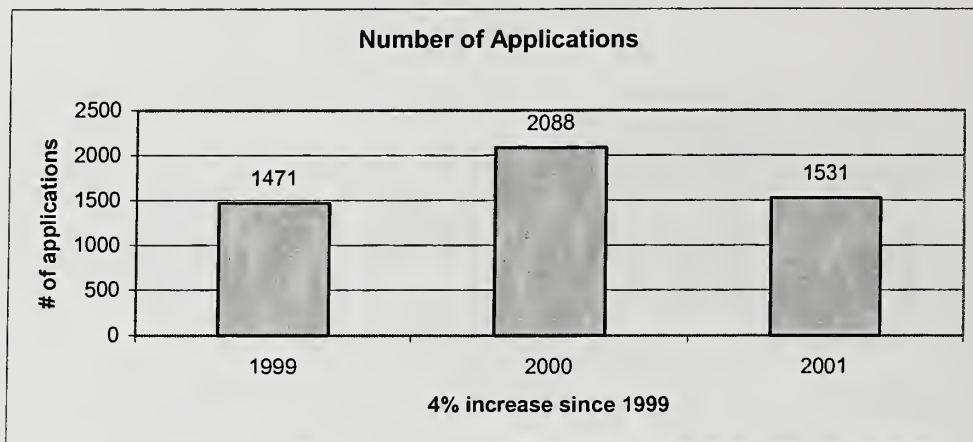
*Caution refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

Citywide Use of *Tier 1** Pesticide Products



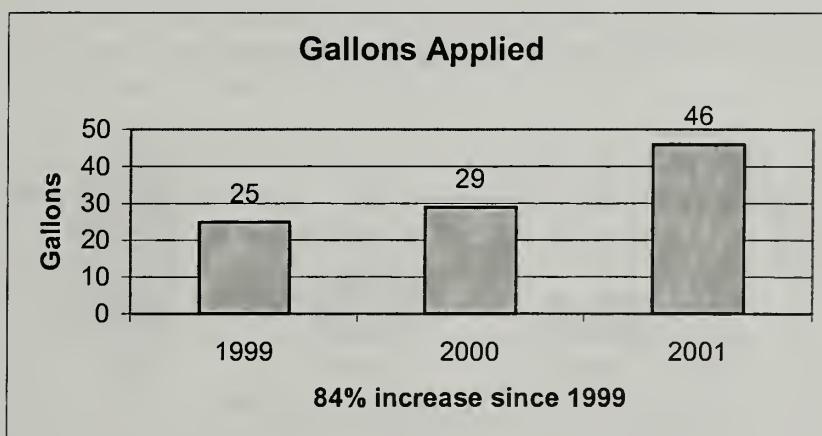
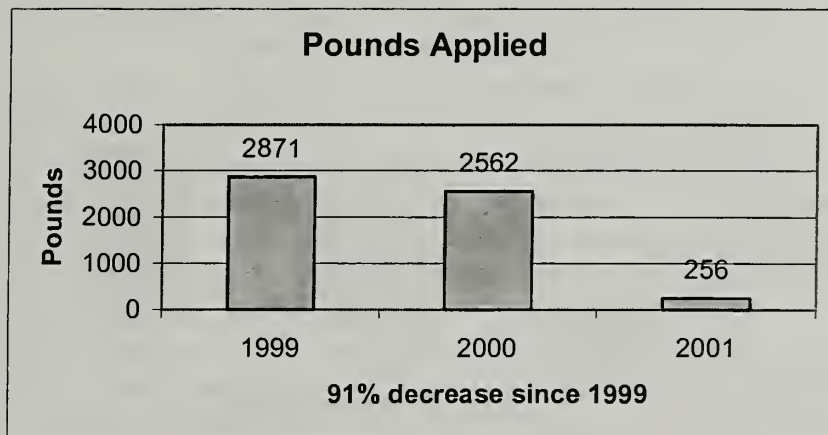
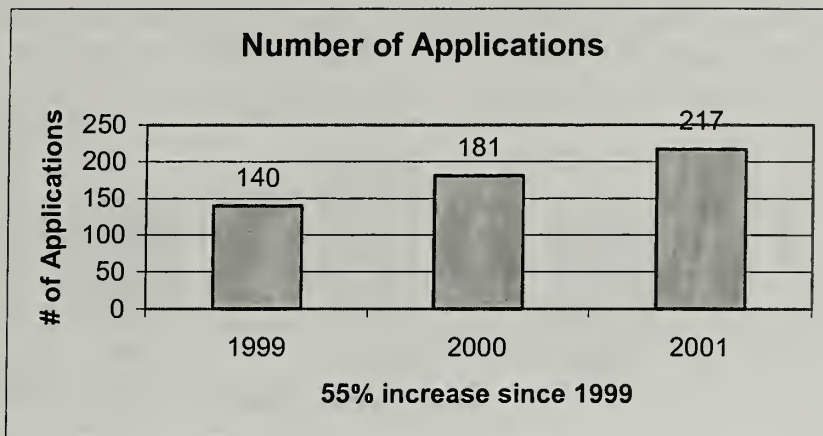
* Tier 1 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts

Citywide Use of *Tier 2** Pesticide Products



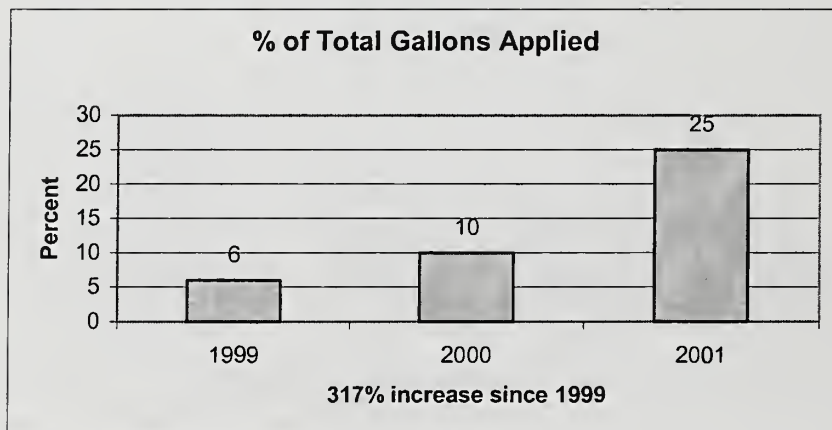
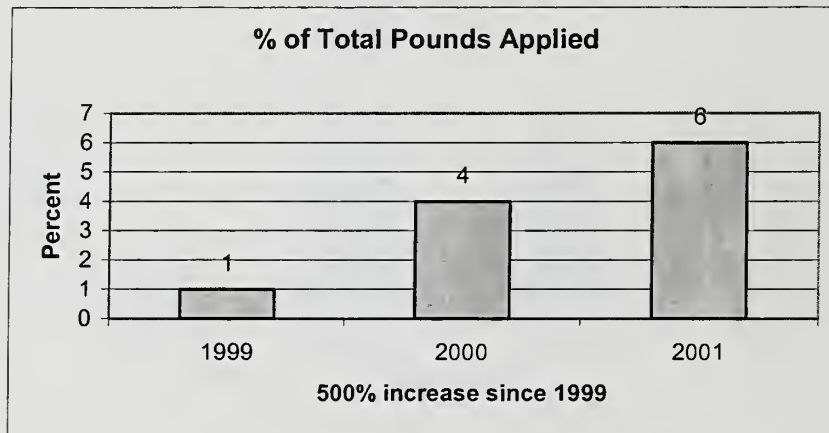
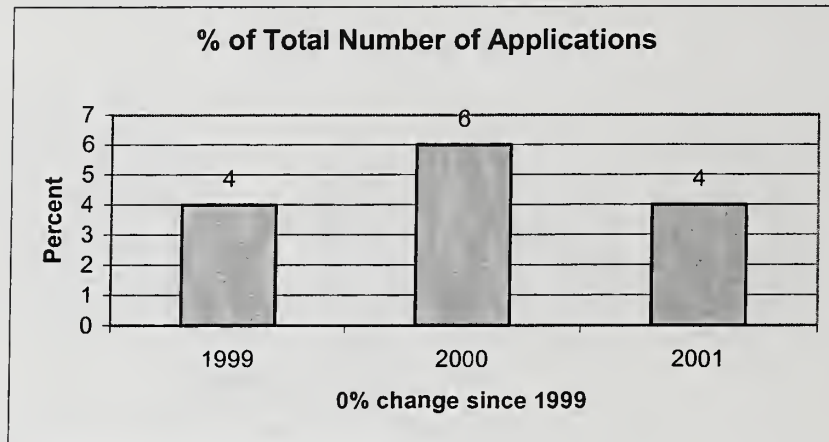
* Tier 2 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

Citywide Use of *Tier 3** Pesticide Products



* Tier 3 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

Usage of "Tier 3"* Products as Percentage of Total Amount (Excluding Bioweed and Suppressa)



* Tier 3 refers to evaluation criteria developed by Mr. Phillip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

Department of Recreation and Parks

Trends in Amounts Used: The Department of Recreation and Parks (DRP) is the biggest user of chemical pesticides because their department accounts for the largest acreage of landscaped area in San Francisco. While the levels of change may not be as significant as seen in other departments the trend in change of use patterns is consistent with other departments and reflects a commitment by DRP staff to embrace the IPM Program. Specifically, DRP shows a decrease in the dry formulation and liquid formulation of 7% and 34% respectively.

It is important to note that the DRP has demonstrated a commitment to the IPM program that may not be wholly reflected in the data included in this report. Activities such as training for staff, pilot projects dealing with compost tea, a successful pilot IPM Program at Sharps Park Golf Course, extensive use of mulch to prevent weeds, use of beneficial insects, and manual removal efforts for aquatic weeds all indicate the DRP's willingness to seek alternatives to chemical pesticides.

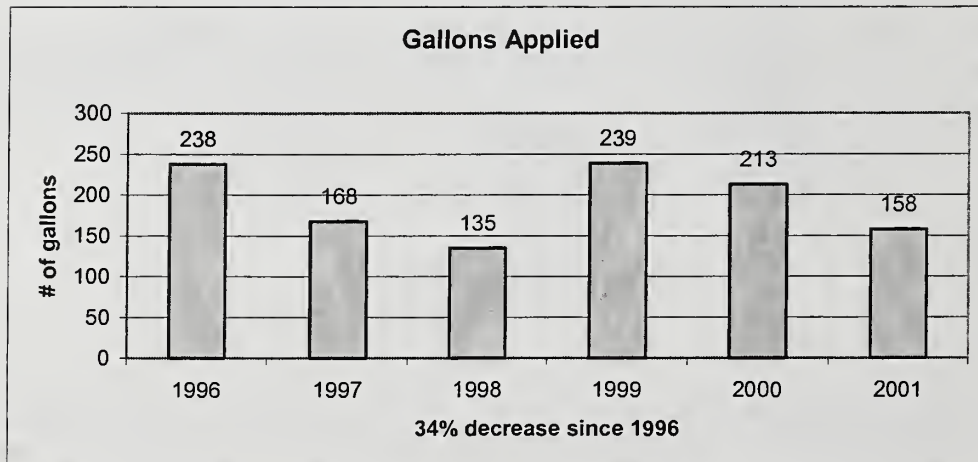
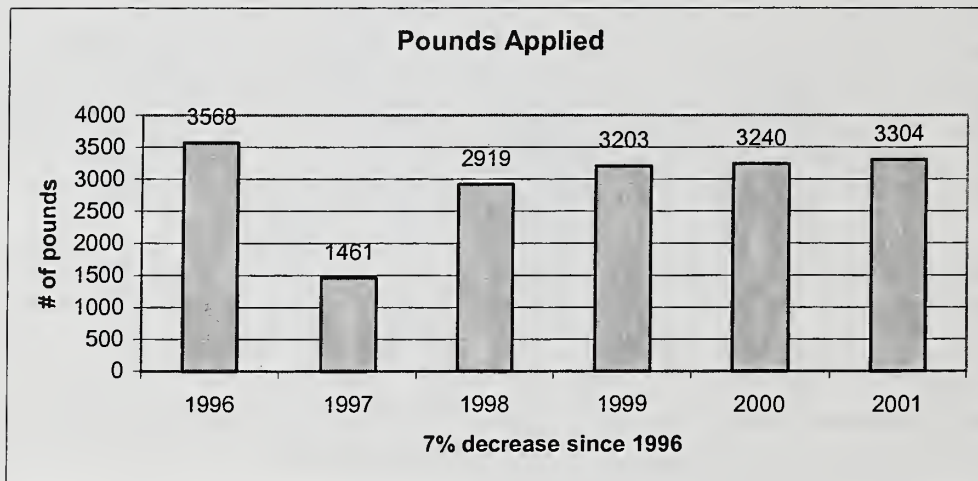
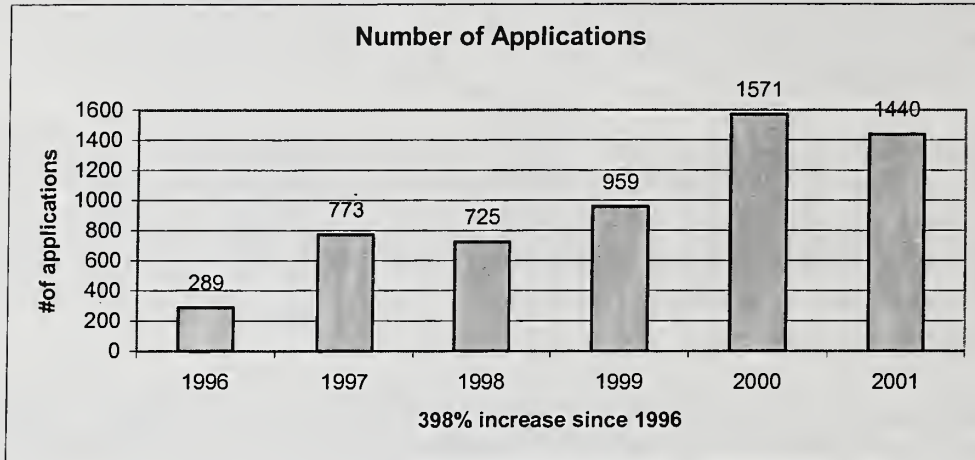
DRP showed a 1270% increase in the number of applications of Roundup. There was no change in pounds of RoundUp and a 25% decrease in the use of liquid formulations.

Trends in Toxicity: DPR eliminated the use of products labeled Danger. The use of products labeled Warning has increased 99% in the number of applications and has decreased 50% and 61% in the amounts used of dry and liquid formulations, respectively. DPR has experienced a consistent increase in the number of applications of products labeled Caution (489% increase). The amount of Caution dry formulation has declined somewhat at a 6% decrease and the liquid formulations have decreased by 10%.

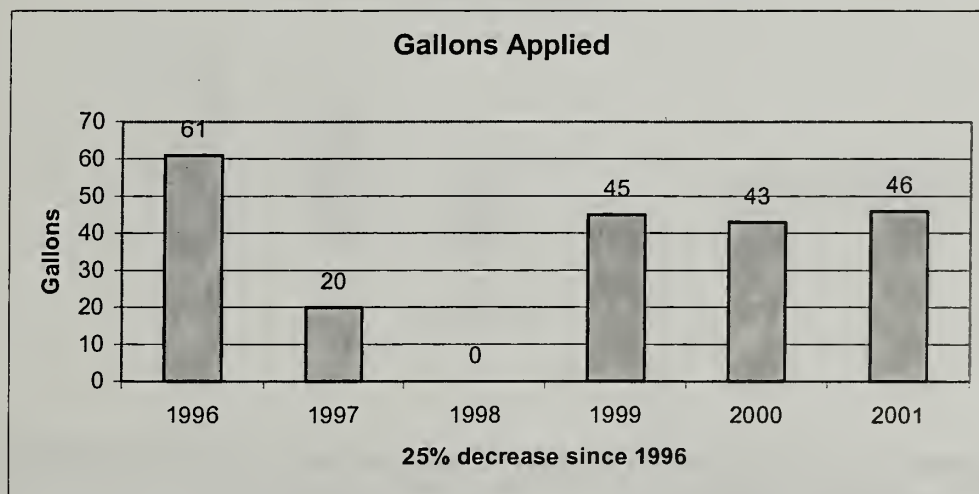
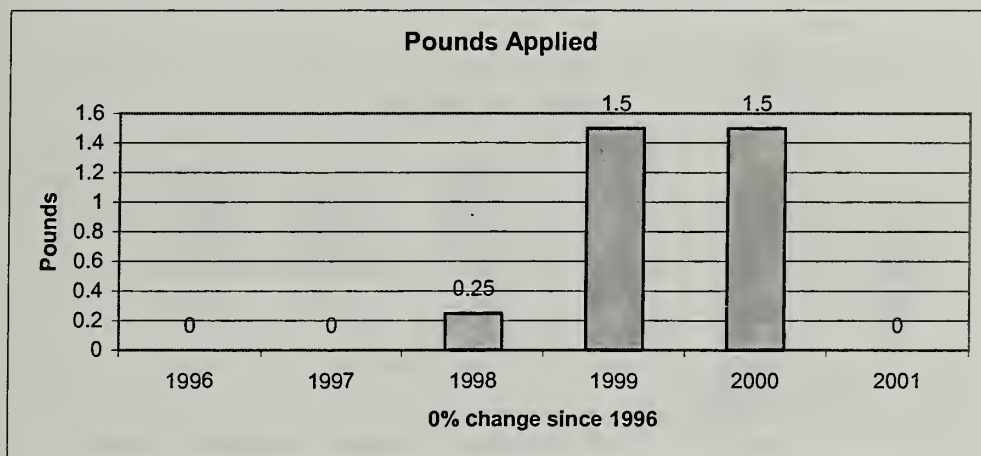
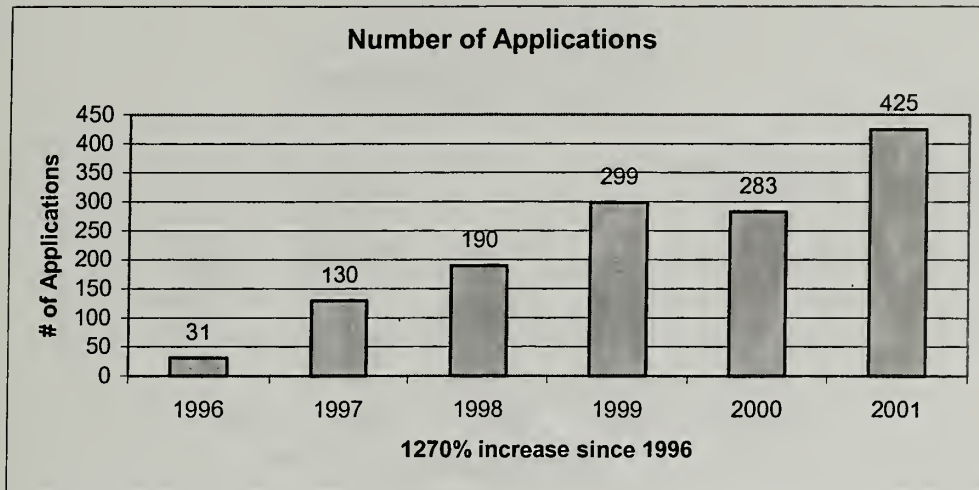
DRP has significantly decreased the amount of Tier 1 products being used, but have not yet eliminated their use. The number of Tier 1 applications decreased by 65% and the use of Tier 1 products declined by 74% and 62% for dry and liquid formulations respectively. We hope to see a continuation of this trend in future years. The use of Tier 2 products has gone up in the last three years; a 279% increase for dry formulations and a 4% decrease for liquid formulations. These increases may be the result of substituting Tier 1 products with the less toxic ones in Tier 2.

DRP experienced a 136% increase in the number of Tier 3 applications and a 63% decrease and 88% increase in the use of Tier 3 dry and liquid formulations respectively. We hope to see a continued increase in the use of Tier 3 products as an indication of DRP staff's willingness to try less toxic alternatives.

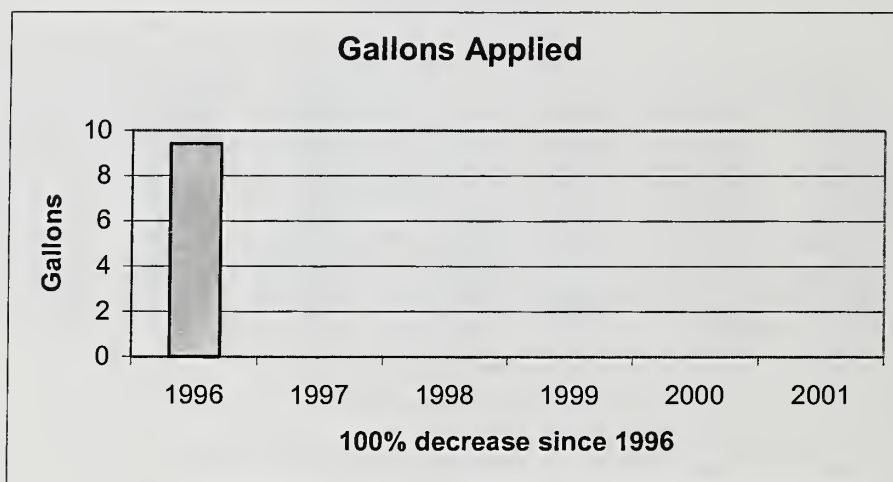
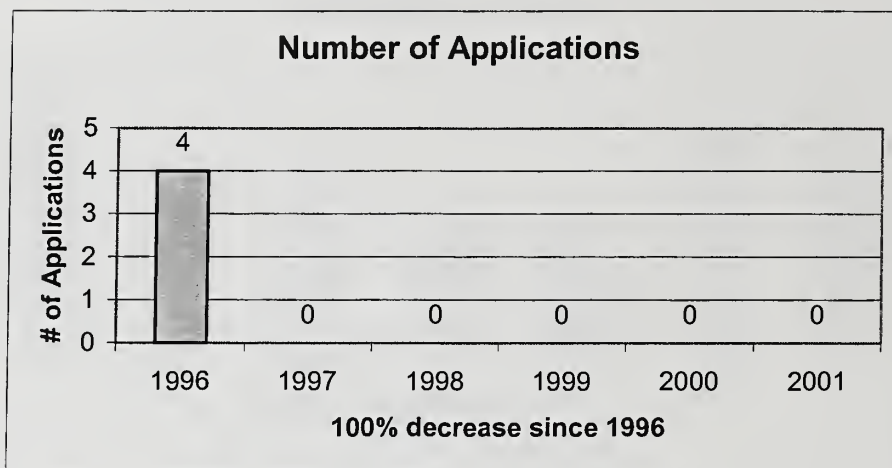
**Recreation and Parks
Total Use of Pesticide Products
(Excluding Bioweed and Suppressa Use)**



Department of Recreation and Parks RoundUp Use



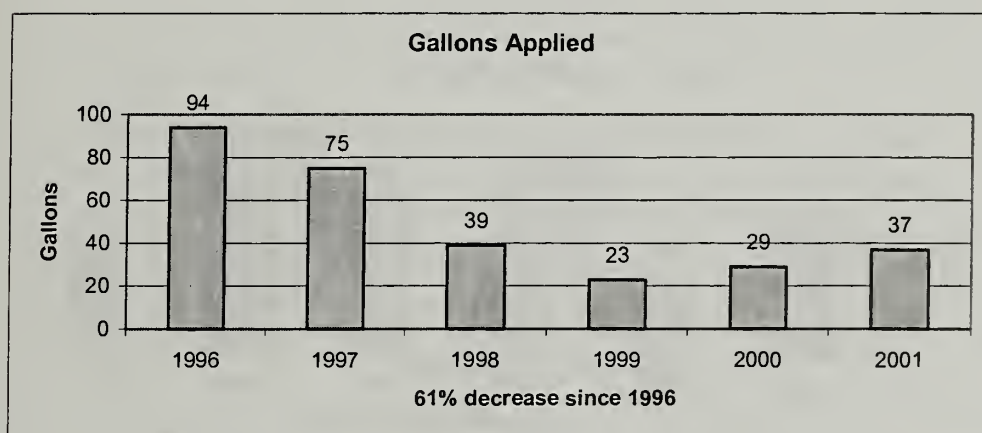
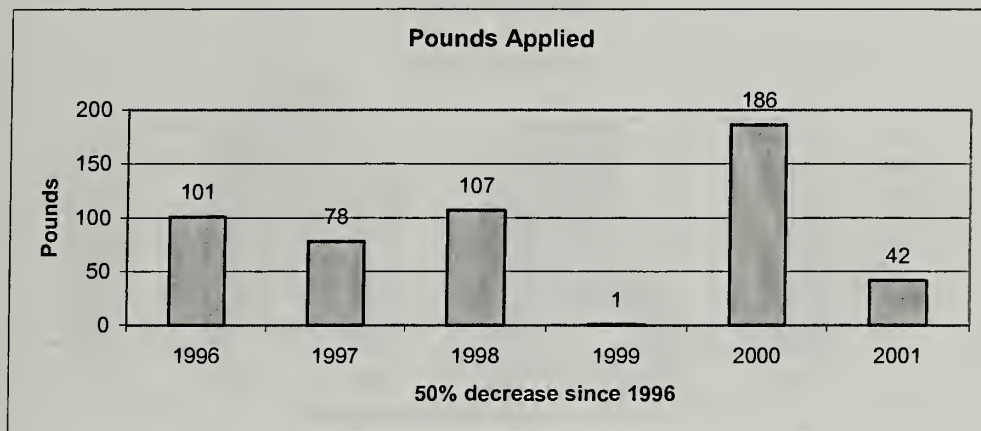
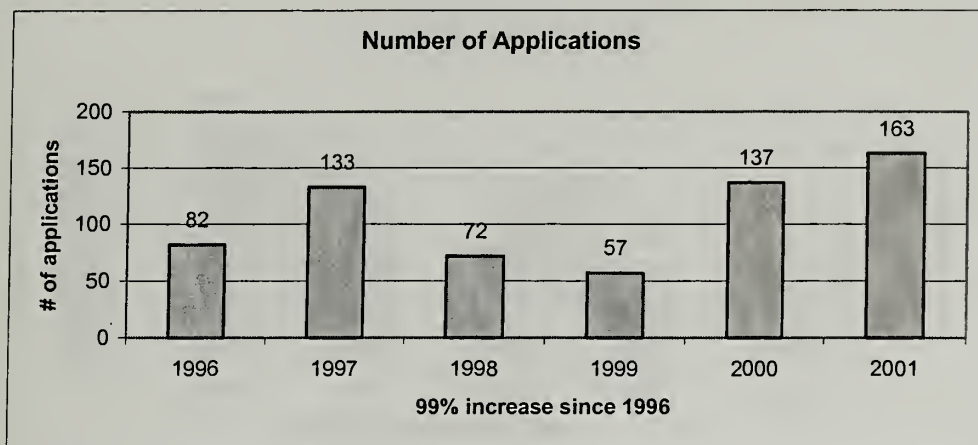
Department of Recreation and Parks
***"Danger"** Products Used**



No Dry Products Reported

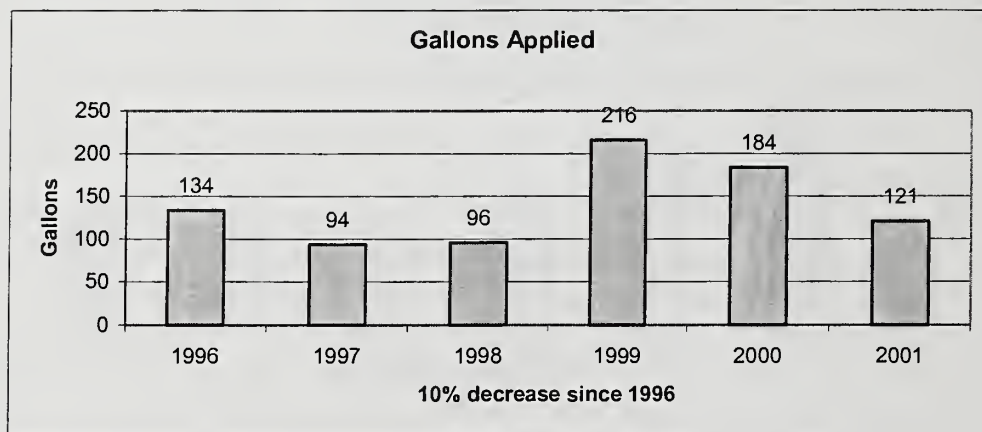
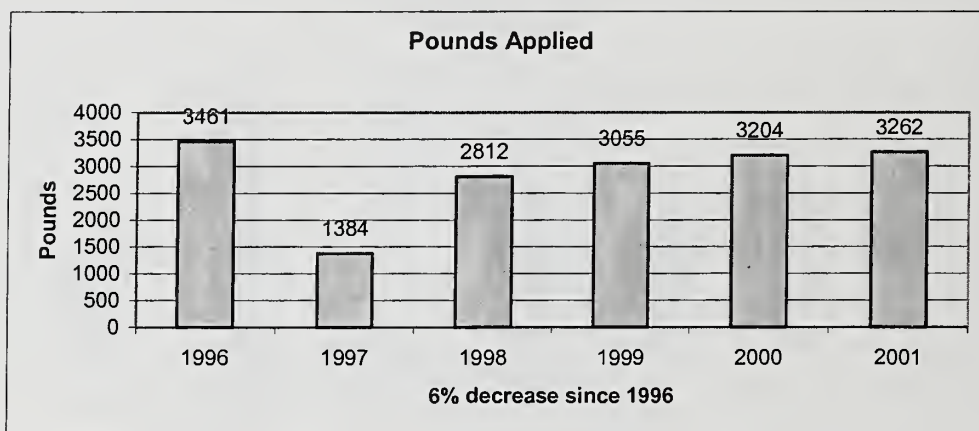
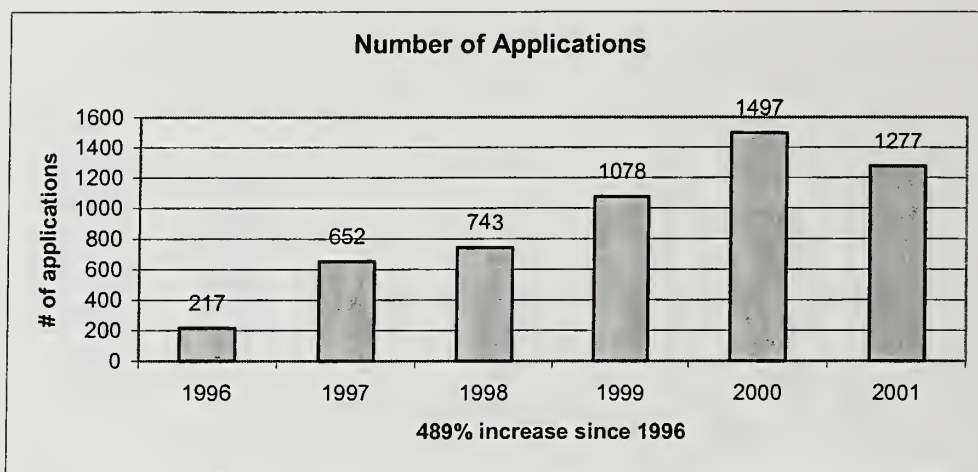
* Caution refers to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

Department of Recreation and Parks "Warning"* Products Used



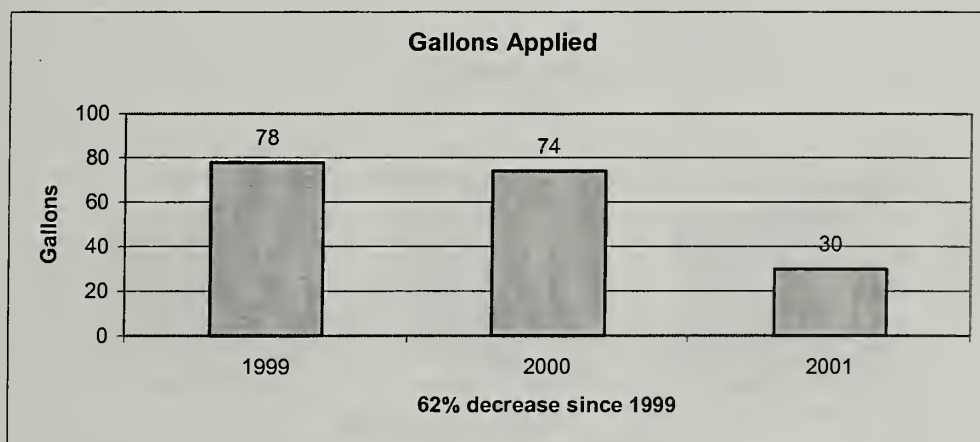
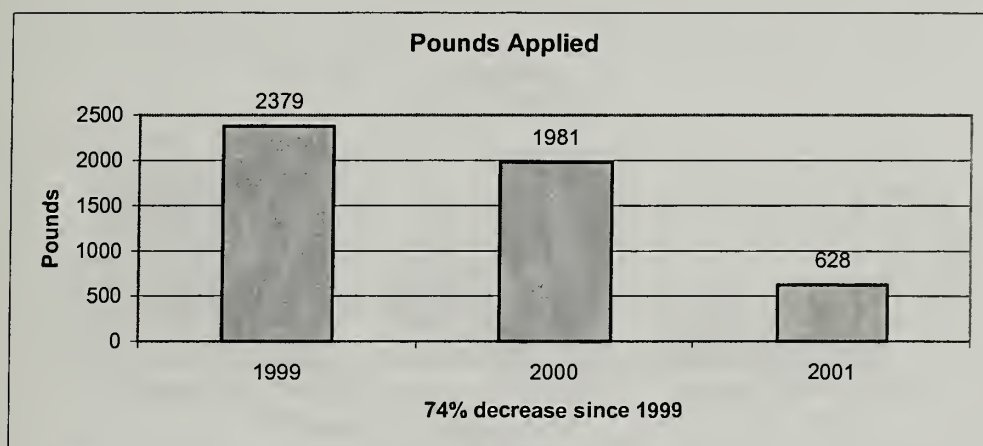
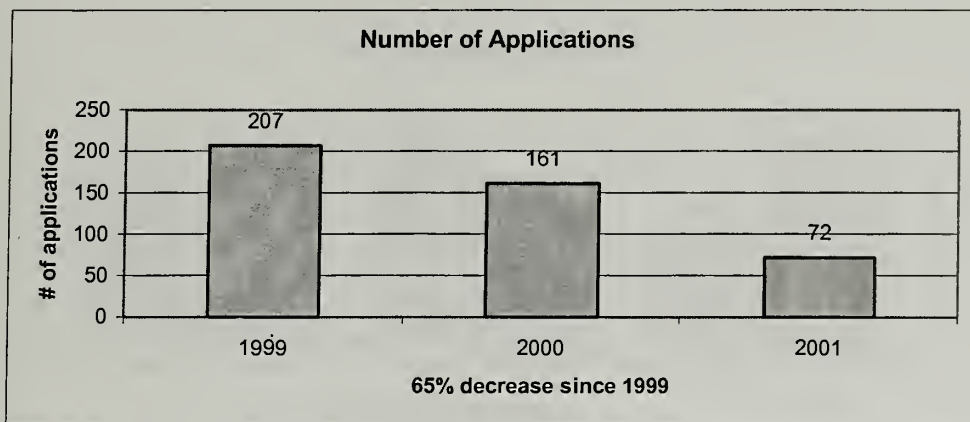
*Warning refers to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

Department of Recreation and Parks *"Caution"** Products Used



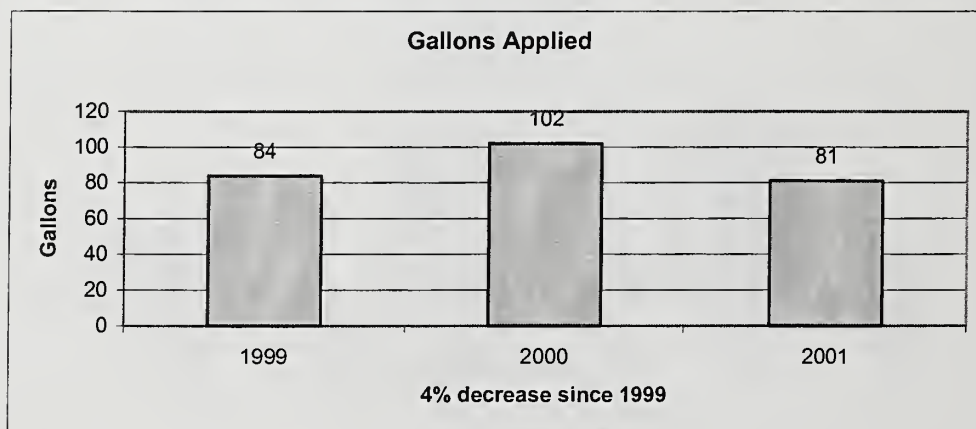
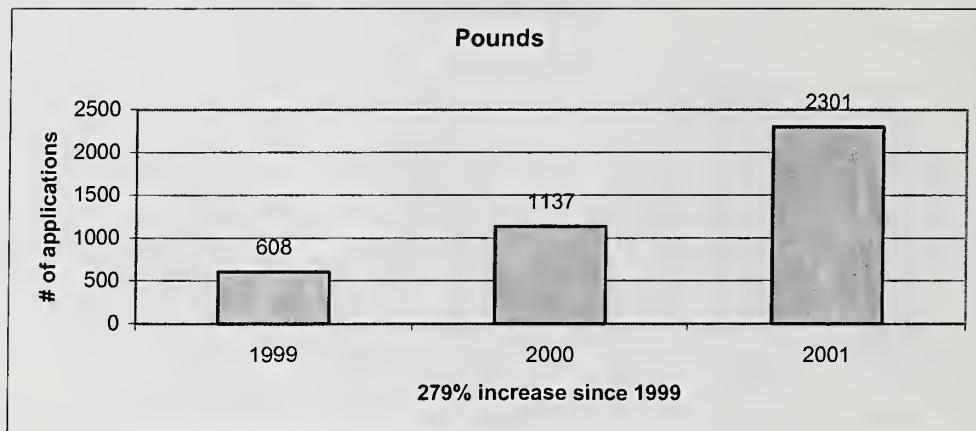
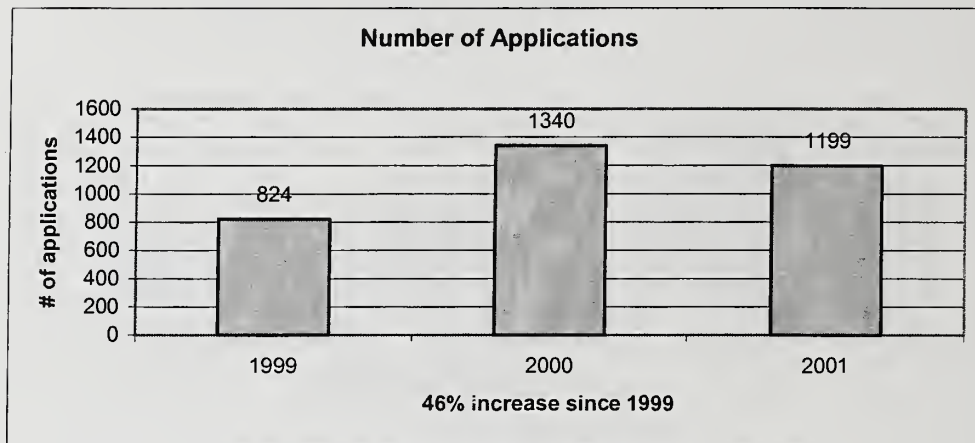
*Caution refers to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

Department of Recreation and Parks Use of *Tier 1** Pesticide Products



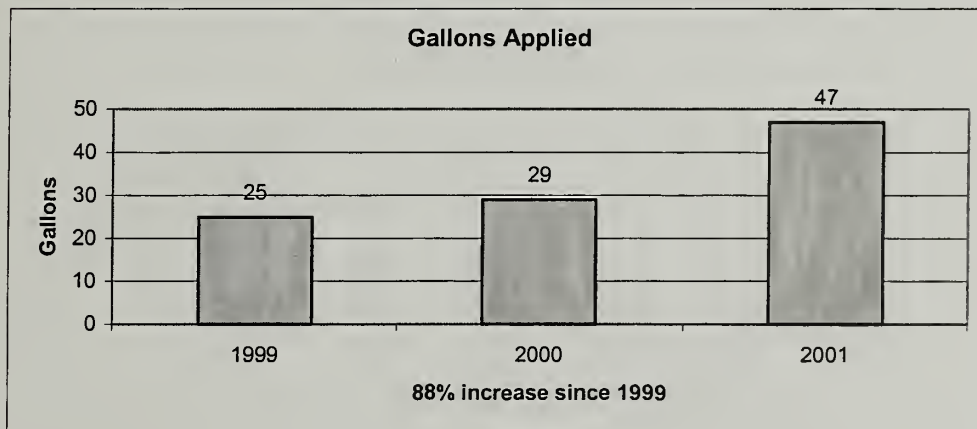
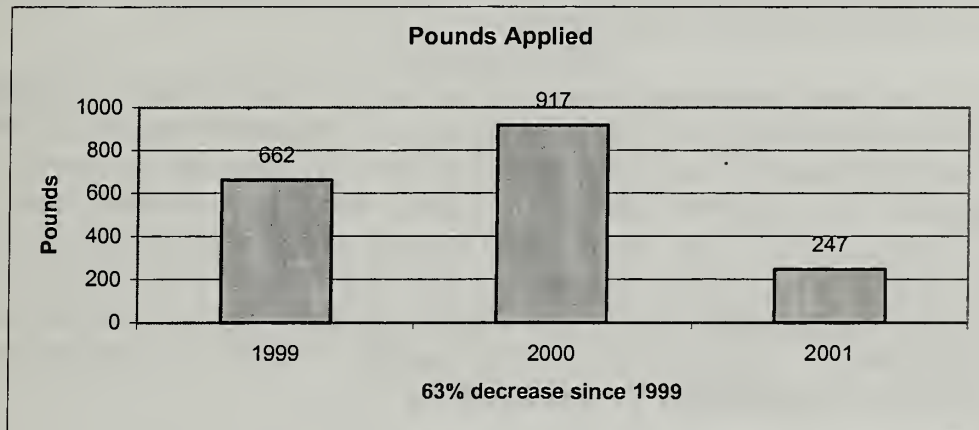
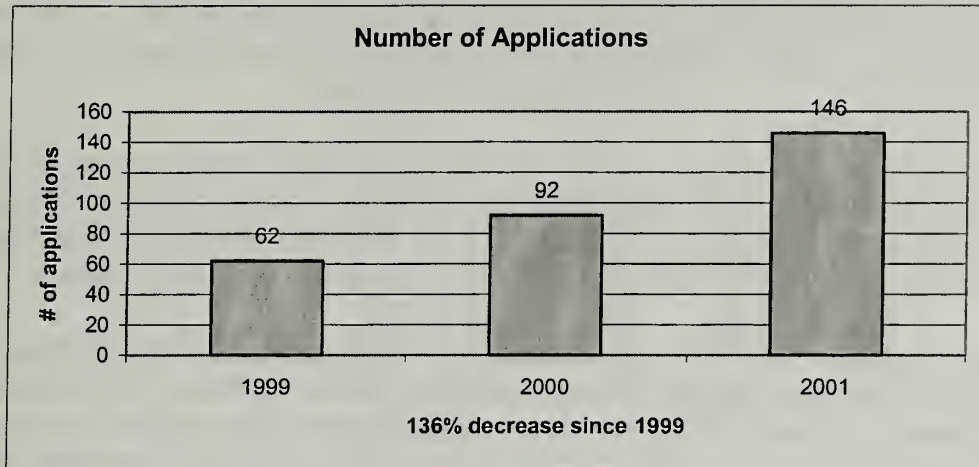
* Tier 1 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

Department of Recreation and Parks Use of *Tier 2** Pesticide Products



* Tier 2 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

Department of Recreation and Parks Use of *Tier 3** Pesticide Products



* Tier 3 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts

Public Utilities Commission

Trends in Amounts Used: The use of pesticides by the Public Utilities Commission (PUC) represents a dramatic success in the implementation of the IPM Program. While PUC shows a 204% increase in the number of pesticide applications, they have achieved over 96% reductions in the amount of pesticide used on their property. This dramatic decrease in pesticide use reflects the many creative non-chemical approaches employed by PUC staff.

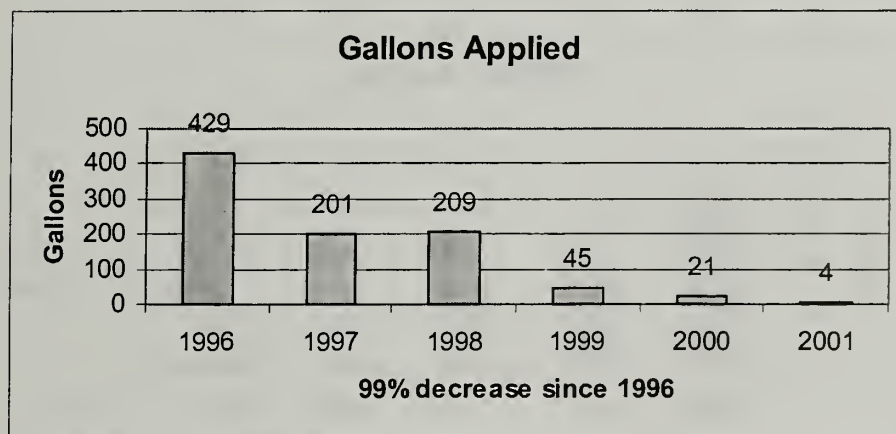
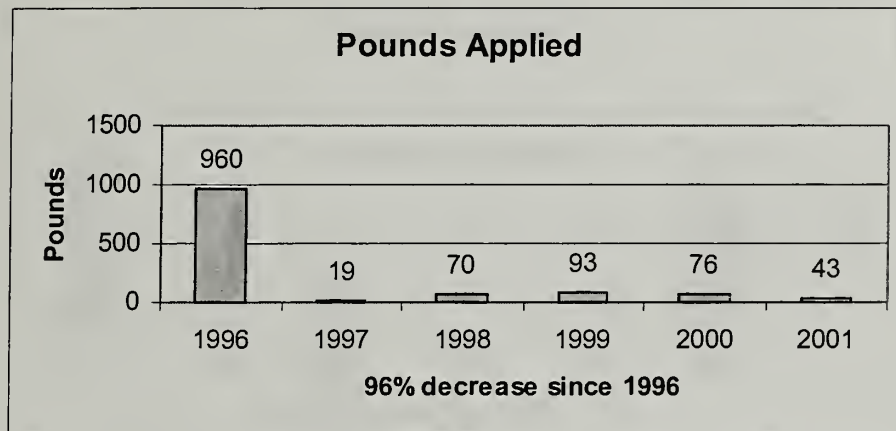
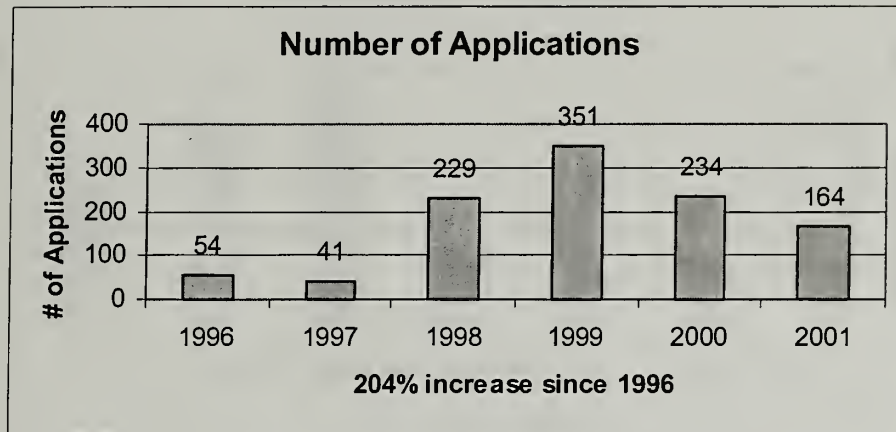
The use of liquid RoundUp at the PUC had dropped to almost zero. Dry formulations of RoundUp have increased by three pounds since 1996. Dry products are less likely to cause exposure to applicators and there is also a decreased likelihood of spillage. The data show a switch from mechanical to chemical means for controlling weeds in 2001.

Trends in Toxicity: The PUC has eliminated the use of products labeled Danger and, as of the year 2000 has eliminated the use of products labeled Warning. The sporadic use of liquid products labeled as Warning may indicate a future need to use these products under special circumstances such as pest outbreaks or weather conditions. The trends in the use of products labeled Caution shows a decrease of 92% in the amount of dry product and a decrease of 99% in the liquid formulations.

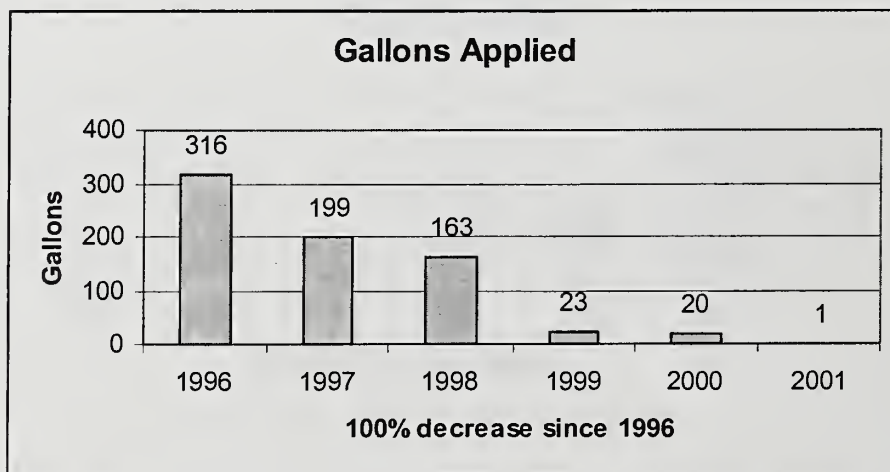
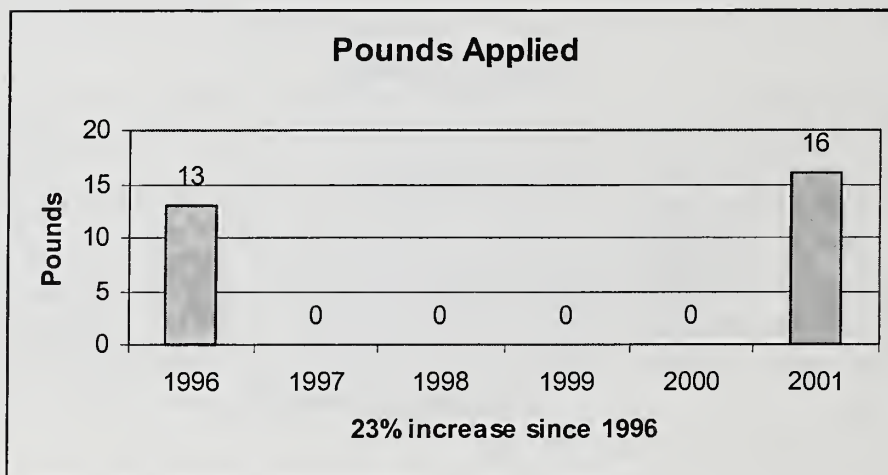
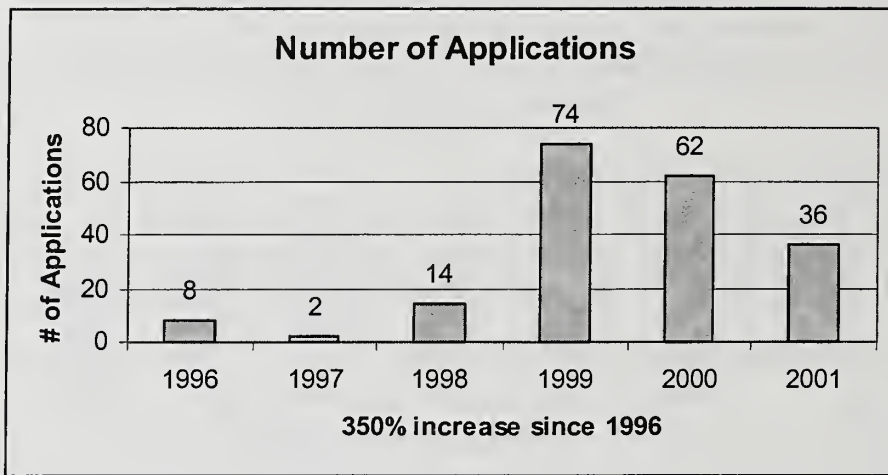
The use of the most hazardous products defined as Tier 1 has dropped off significantly but they have not managed to eliminate their use. The number of applications has decreased by 82% and the use of dry pesticides by 87%. The small amount of Tier 1 liquid product (0.16 gallons) is applied to manage weeds on watershed lands to meet State and Federal needs. The use of Tier 2 products shows a decrease by 51% in the number of applications. The use of dry formulation increased by 100% and the use of liquid formulation decreased by 87%. The Tier 3 product use showed a decrease of 7% in the applications and a decrease of 11% of dry product. The PUC is moving toward the use of more environmentally sensitive products.

Public Utilities Commission

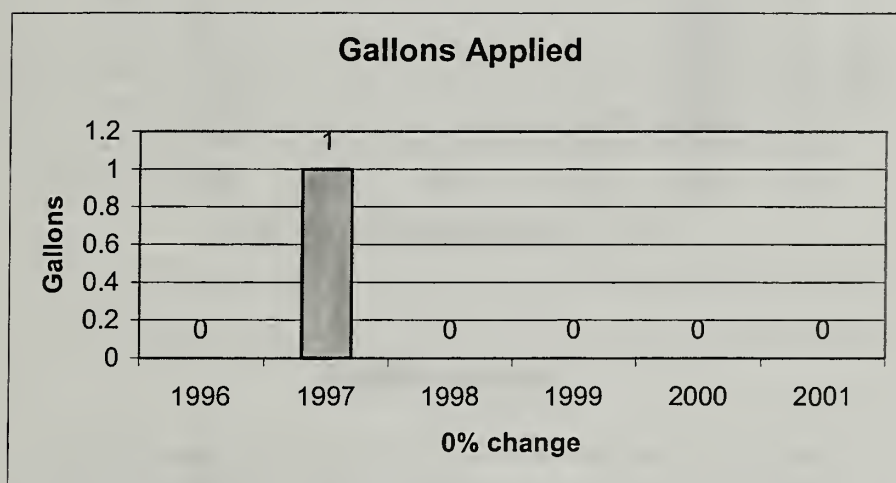
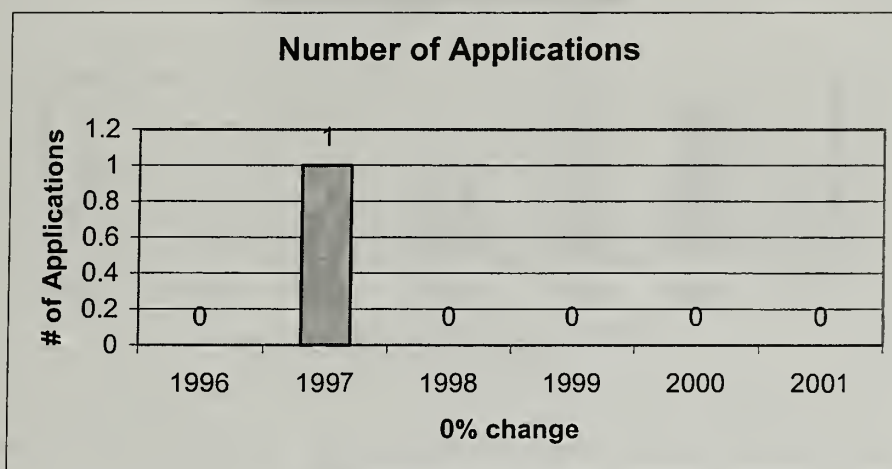
Total Use of Pesticide Products (Excluding Bioweed and Suppressa)



Public Utilities Commission RoundUp Use



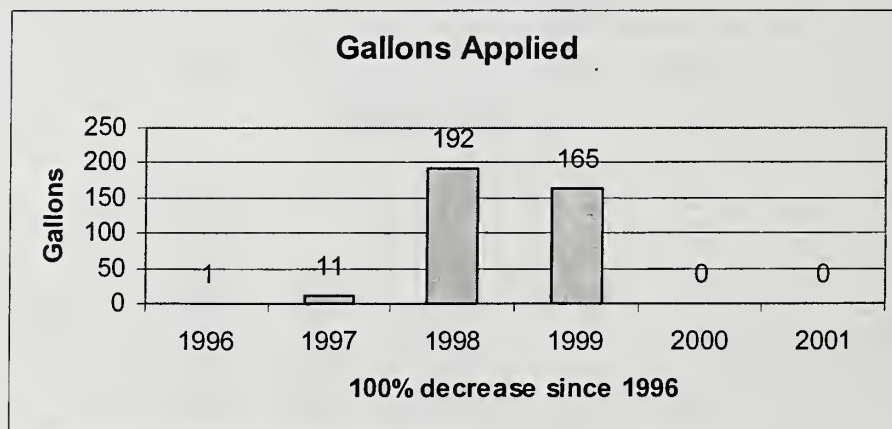
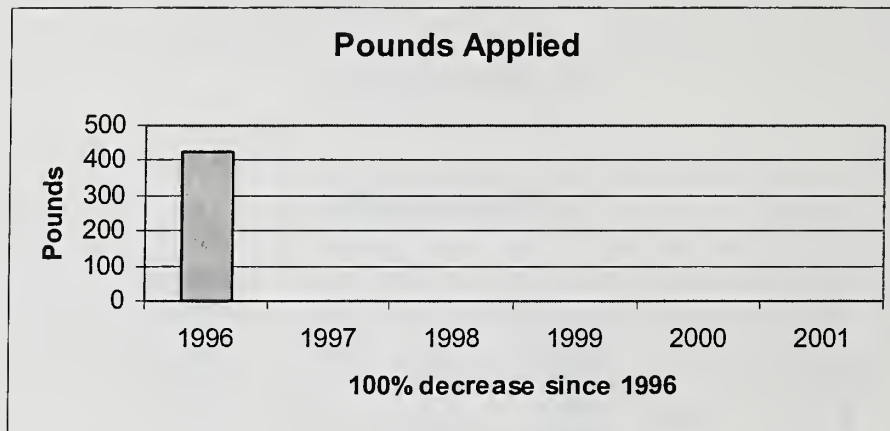
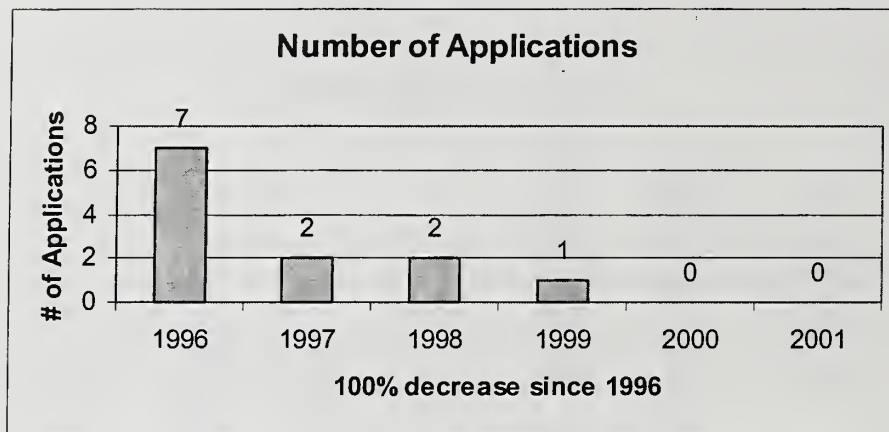
Public Utilities Commission "Danger"* Products Used



No Dry Products Reported

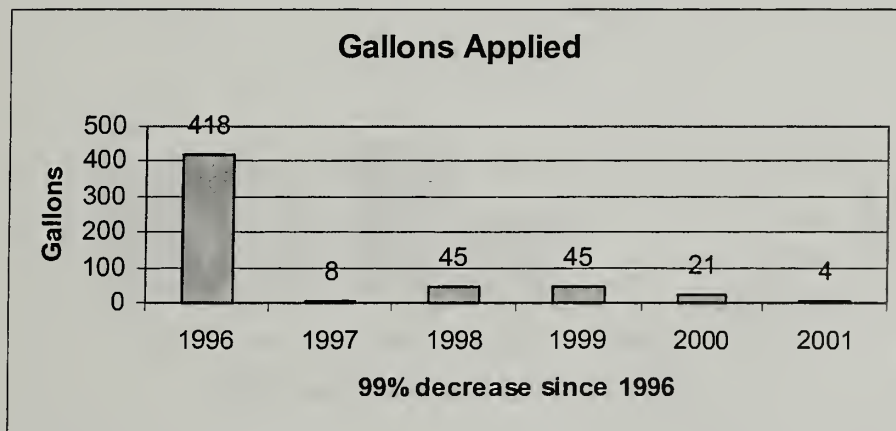
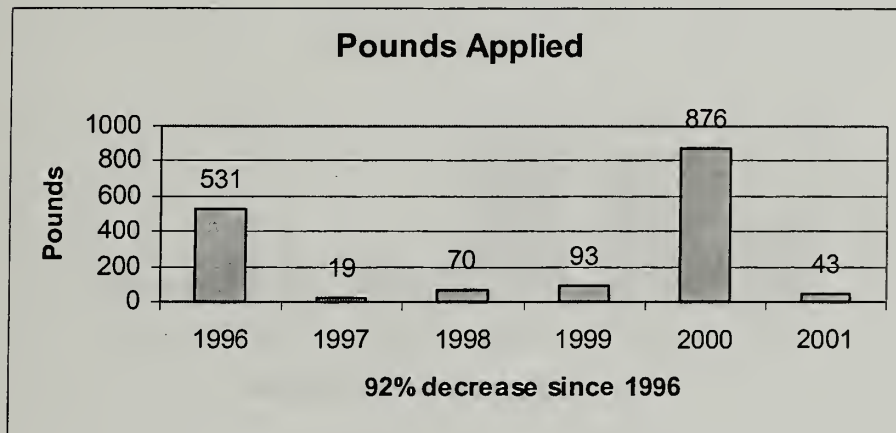
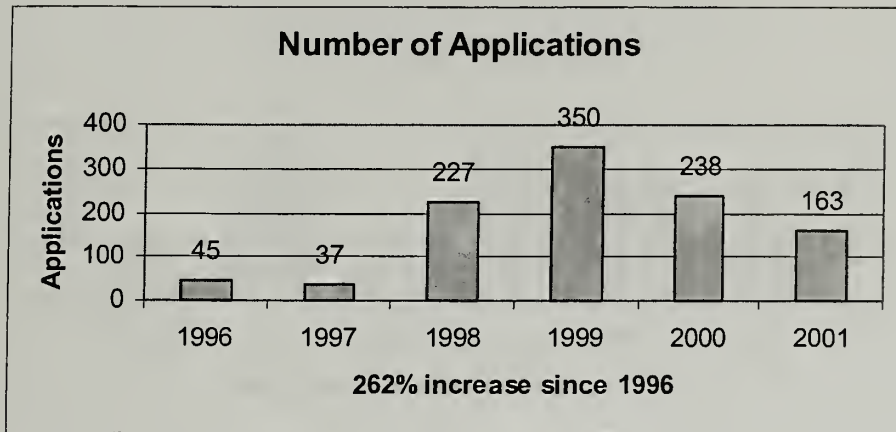
* Danger refers to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

Public Utilities Commission “Warning”* Products Used



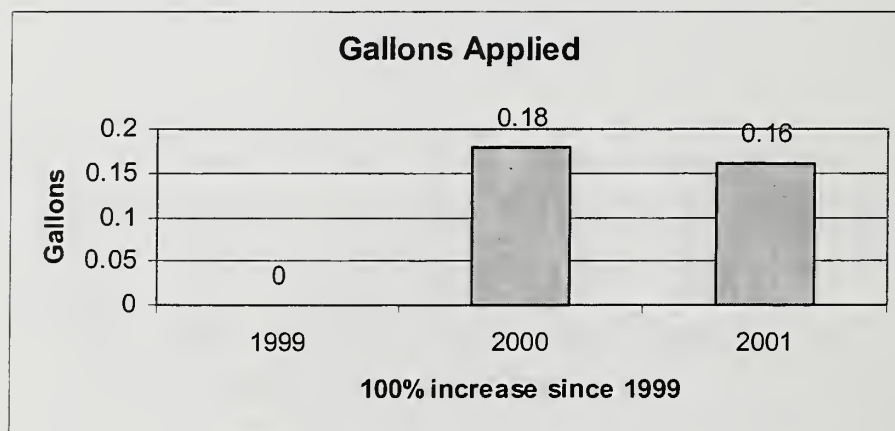
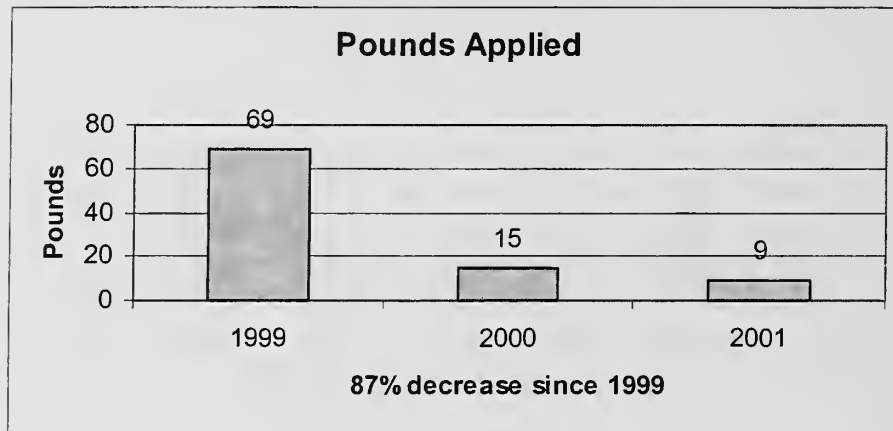
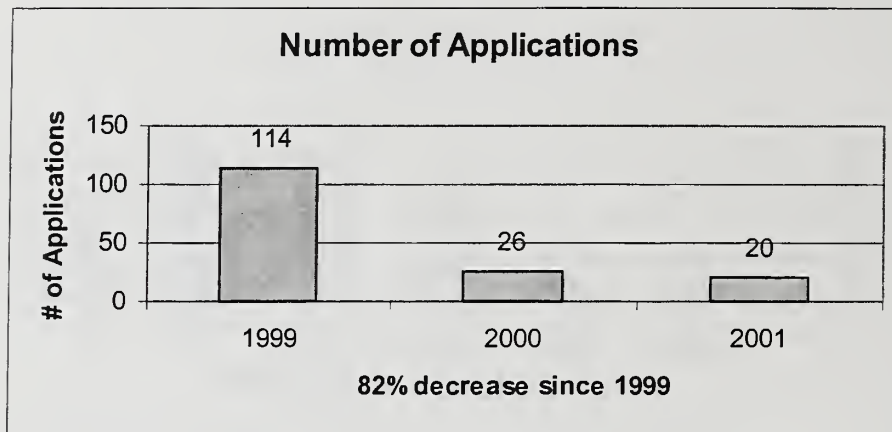
* Warning refers to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

Public Utilities Commission "Caution"* Products Used



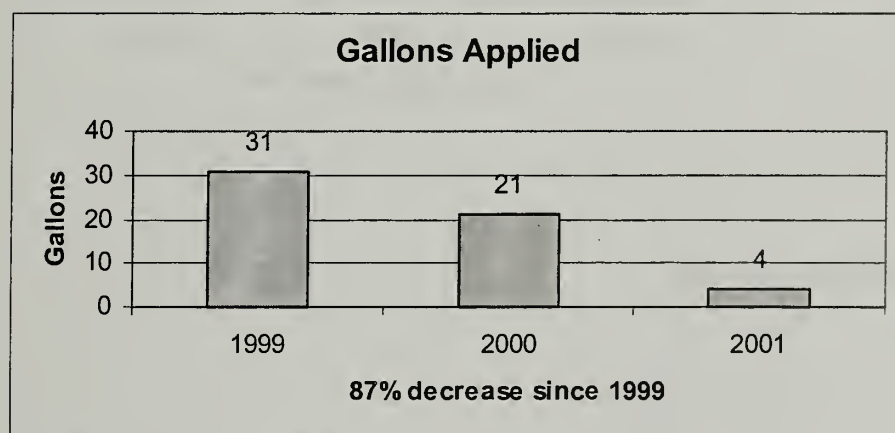
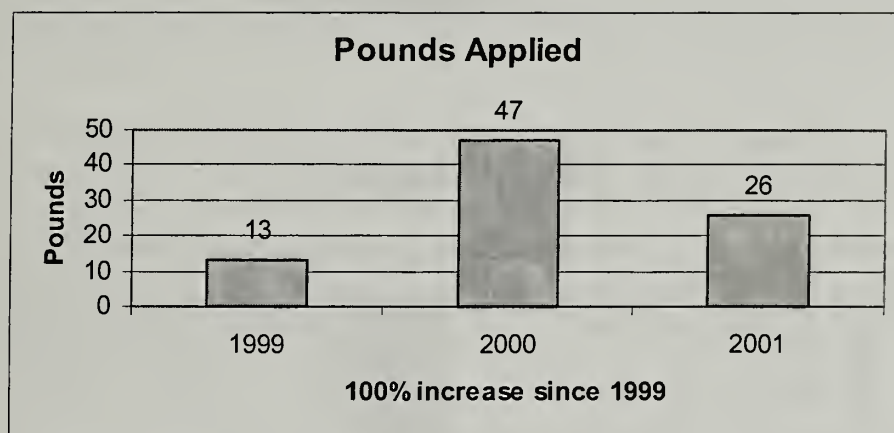
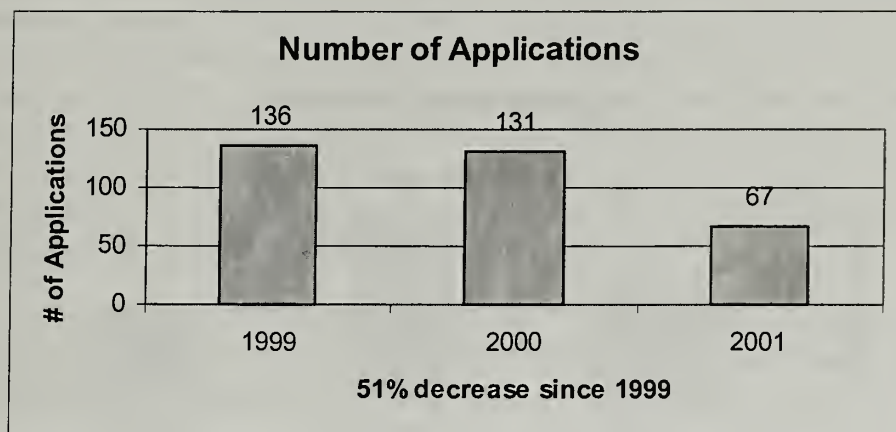
*Caution refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

Public Utilities Commission Use of "Tier 1"* Pesticide Products



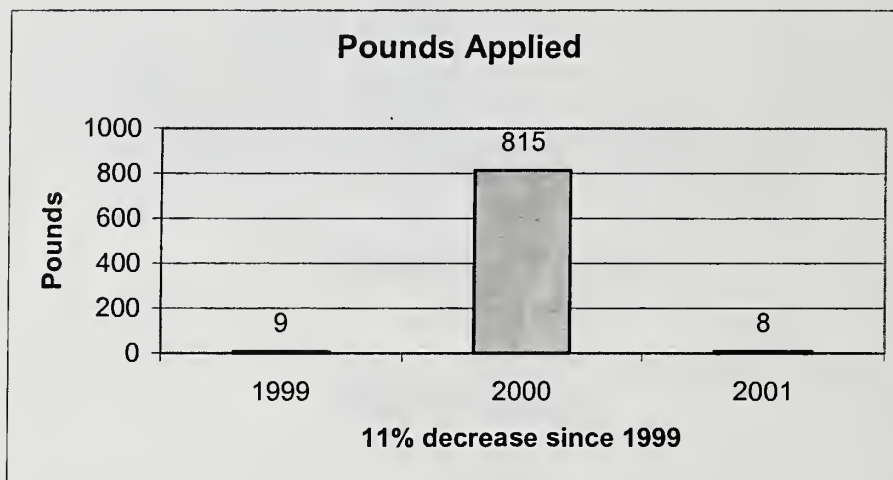
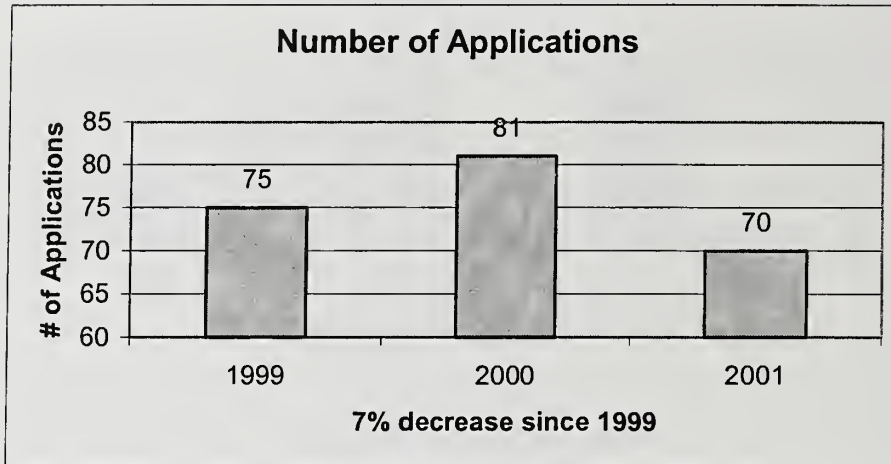
* Tier 1 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts

Public Utilities Commission Use of "Tier 2"* Pesticide Products



*Tier 2 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts

Public Utilities Commission Use of "Tier 3"* Pesticide Products



No Liquid Products Reported

*Tier 3 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

Department of Public Health

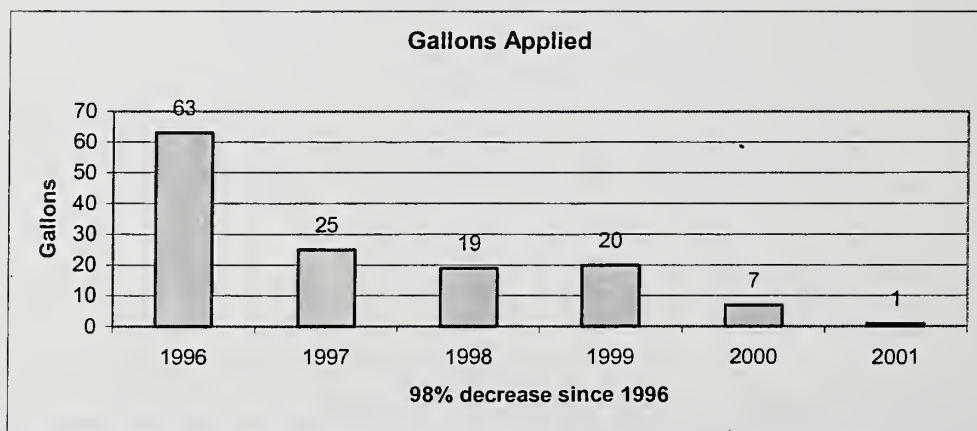
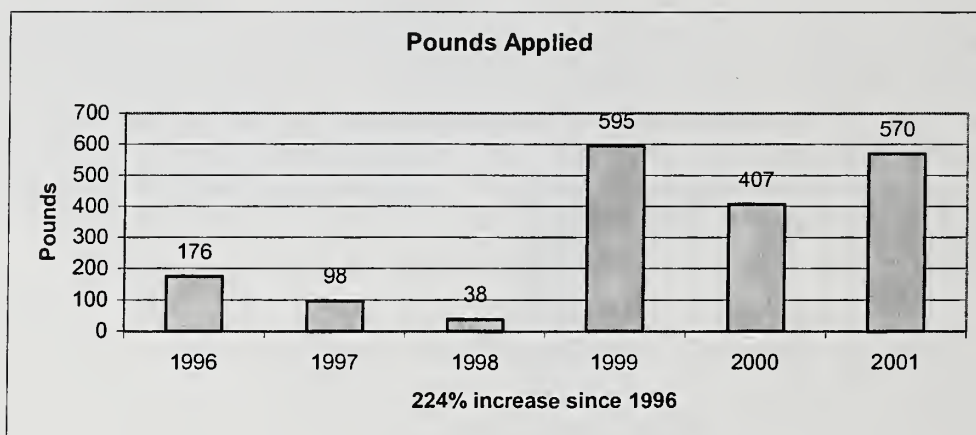
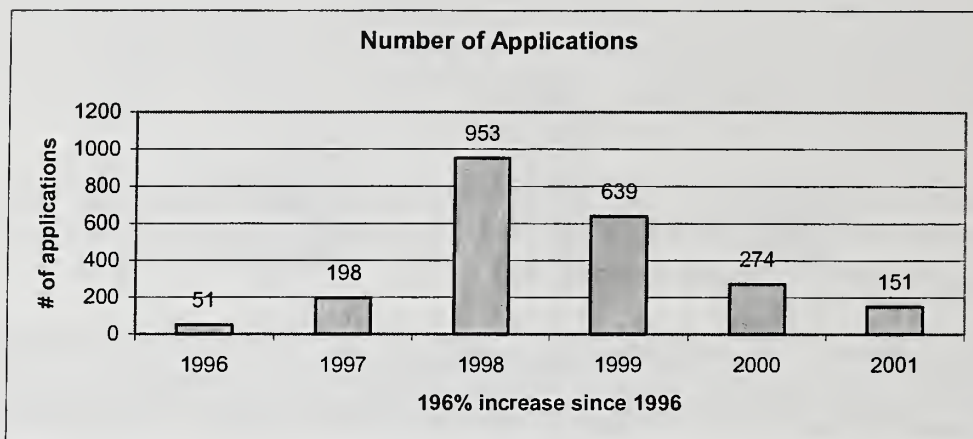
Trends in Amounts Used: The Department of Public Health (DPH) reflected similar trends to other City Departments, but poor records in the early years of the program may have impacted the data. While the number of applications rose overall 196% the graph shows that in the last four years, a time of improved record keeping, the actual number of applications is declining. The amount of dry formulation pesticides used increased by 224% and is a result of a rodent abatement program for the sewers and catch basins being overseen by DPH. In fact, rodenticides account for 566 pounds of the 570 pounds of pesticides used by DPH in 2001. Liquid pesticide products tell a different story. There has been a dramatic 98% decrease in liquid pesticides since 1996.

The use of RoundUp at DPH has decreased by 100%. The likely explanation for the elimination of RoundUp comes from staffing shortfalls at Laguna Honda and lack of reporting by outside contractors at clinics.

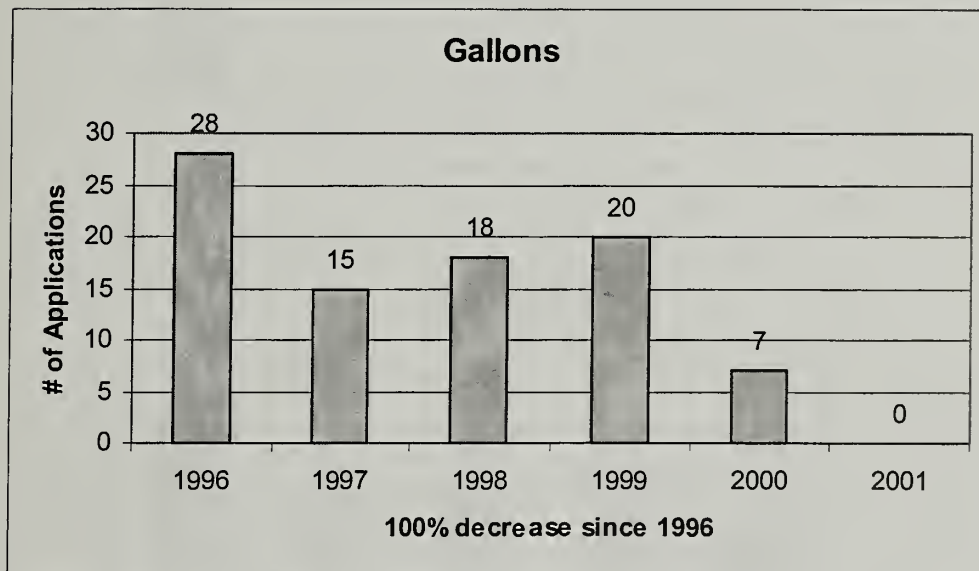
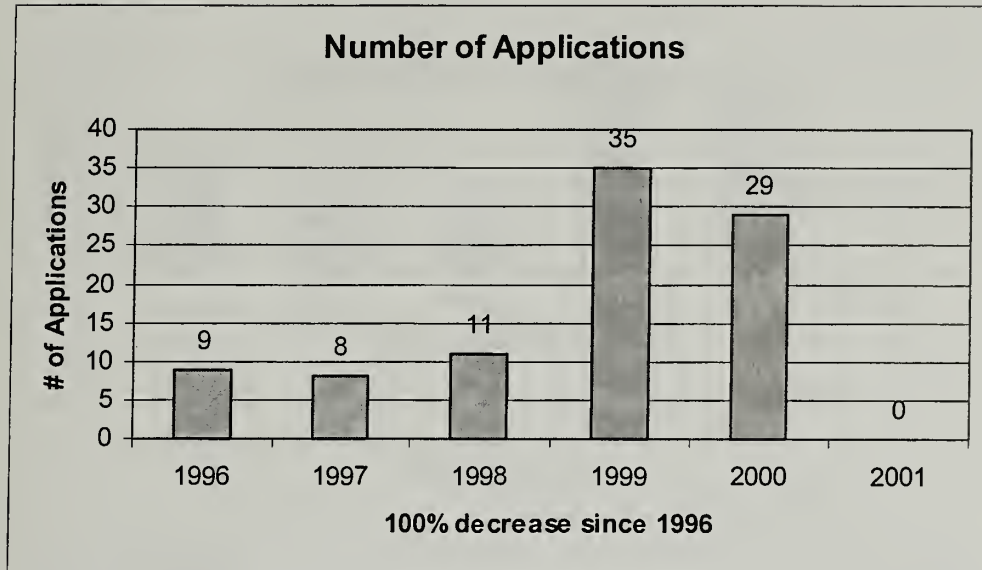
Trends in Toxicity: DPH staff never used products labeled Danger and have eliminated the use of pesticide products labeled Warning. The amount of pesticide products labeled Caution has increased 338%. 99% of this increase is due to the use of rodenticides.

The use of the most hazardous products defined as Tier 1 has dropped with an 81% decrease in the number of applications and a 3% decline in the use of dry pesticides. All of the Tier 1 products used by DPH are rodenticides. We expect to see these trends continue. DPH experienced a 59% decrease in the use of dry formulations of Tier 2 products with a 7% and 95% decrease in dry and liquid formulations respectively. DPH is not using any product designated as Tier 3. We encourage DPH to substitute Tier 3 products instead of using Tier 2 products.

Department of Public Health Total Use of Pesticide Products (Excluding Bioweed & Suppressa Use)



Department of Public Health RoundUp Use



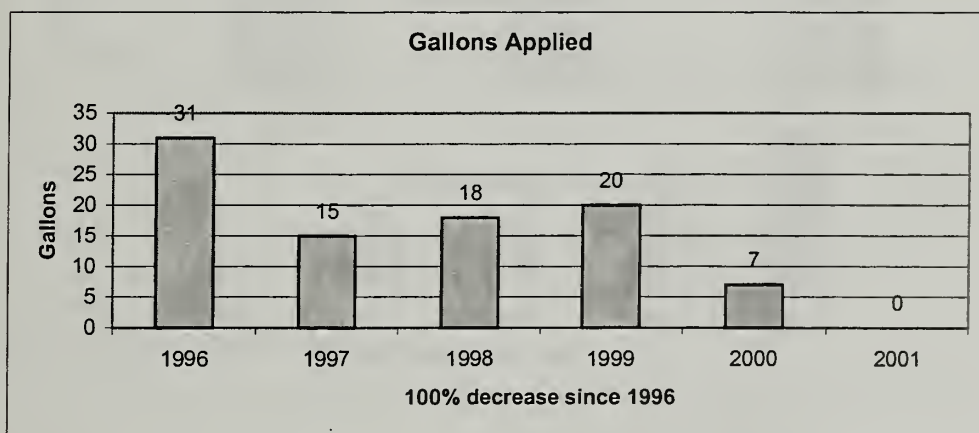
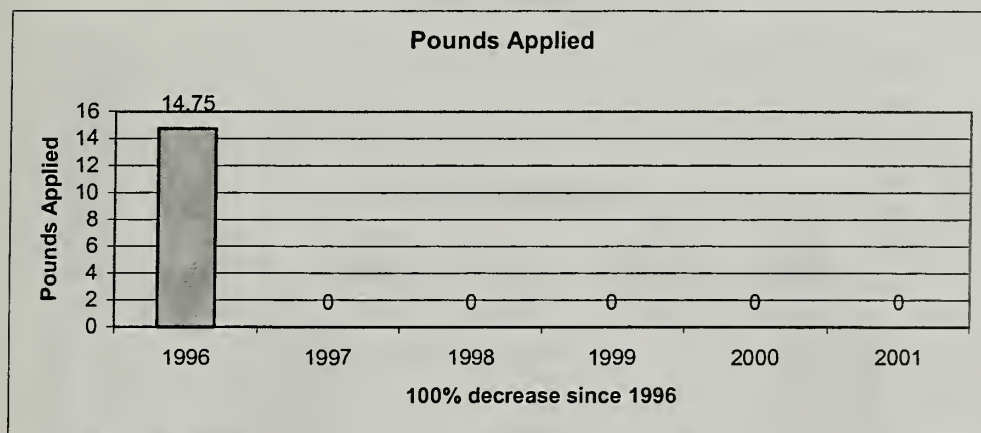
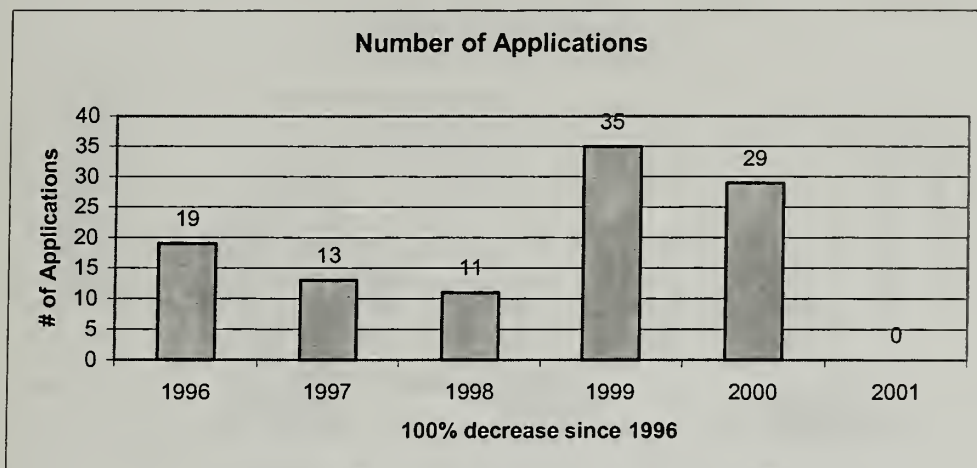
No Dry Products Reported

Department of Public Health
***"Danger"** Products Used**

No Reported Use of Danger Products

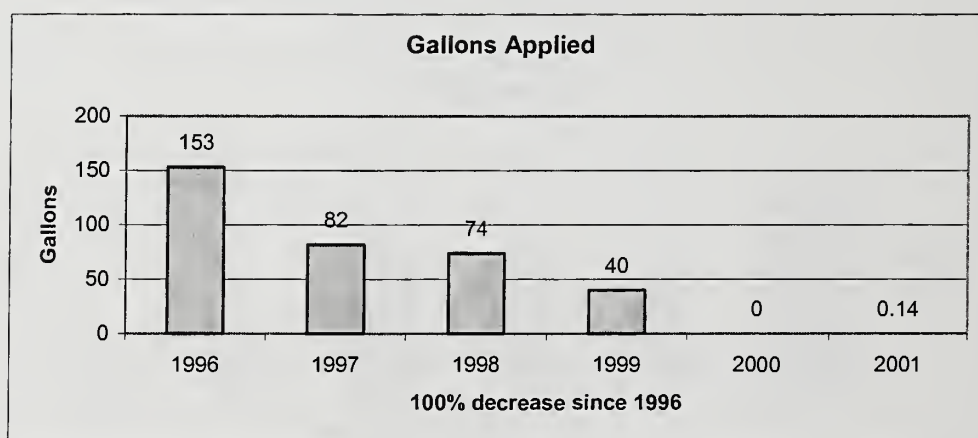
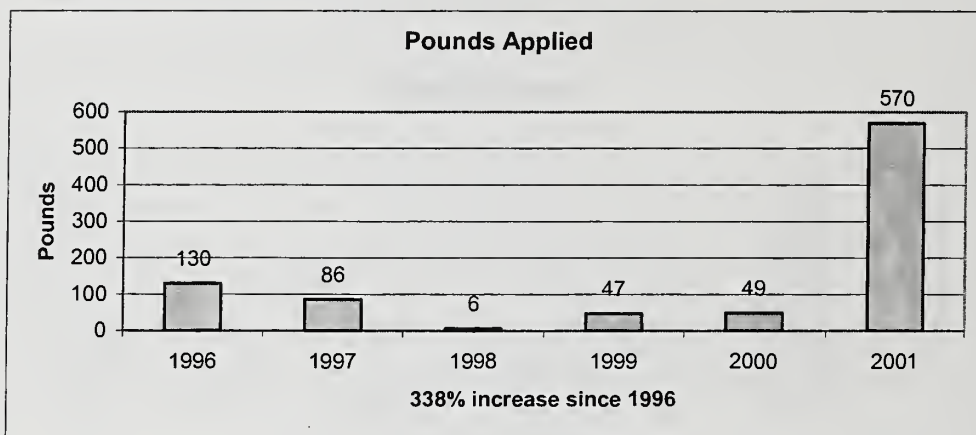
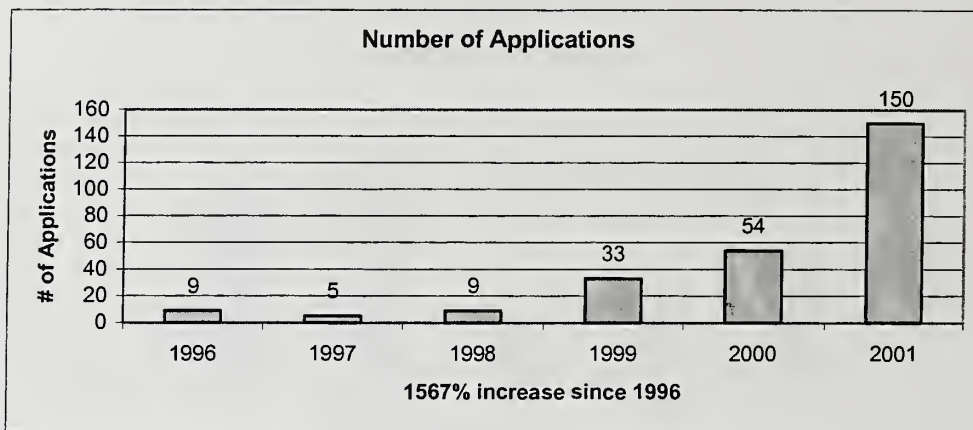
*Danger refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

Department of Public Health “Warning”* Products Used



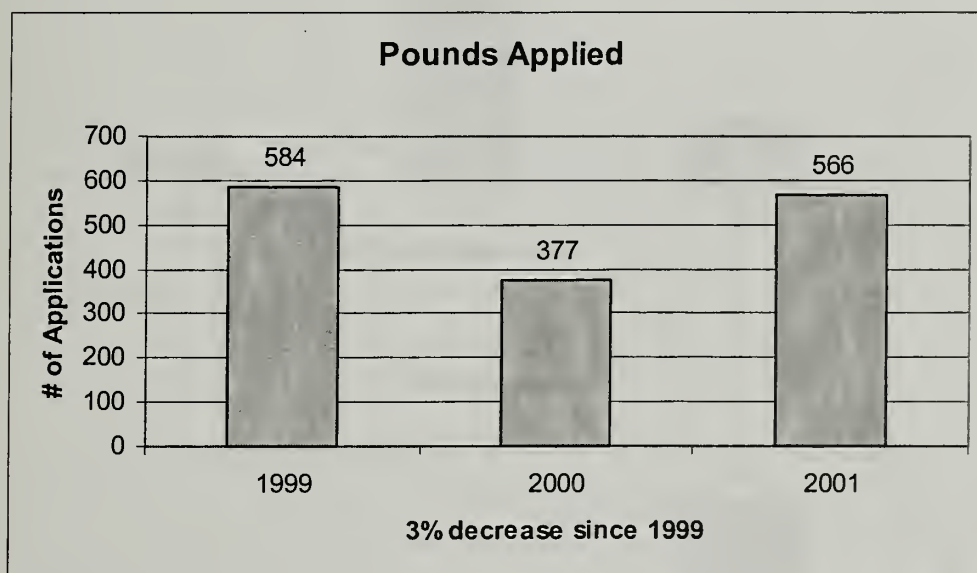
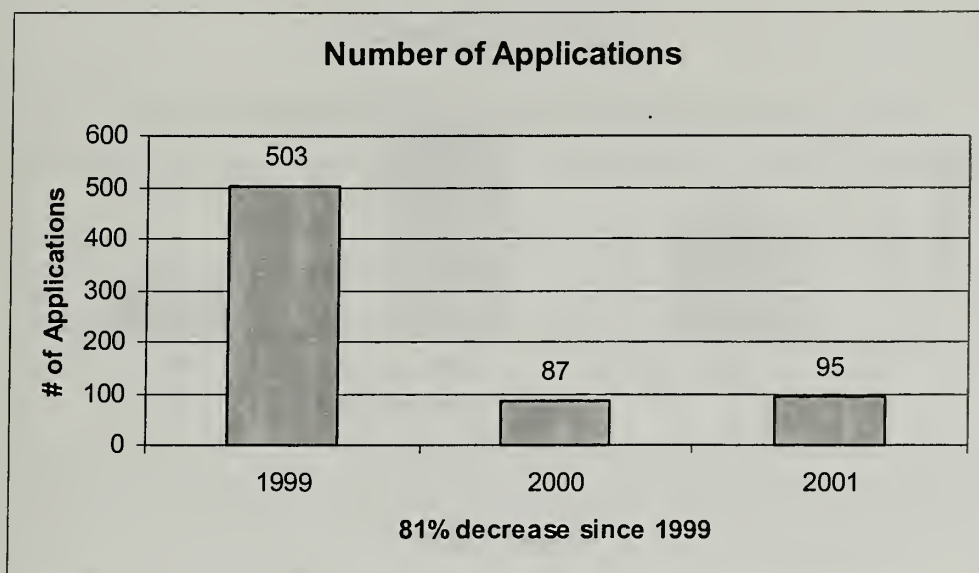
* Warning refers to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

Department of Public Health "Caution"* Products Used



*Caution refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

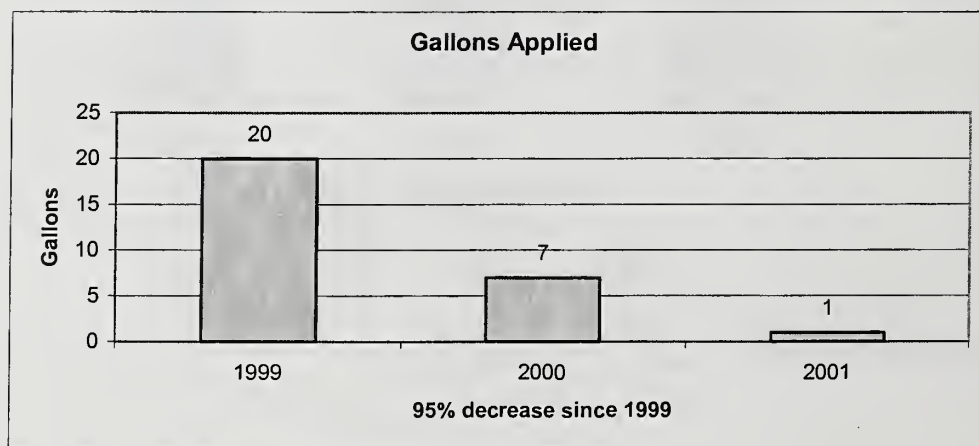
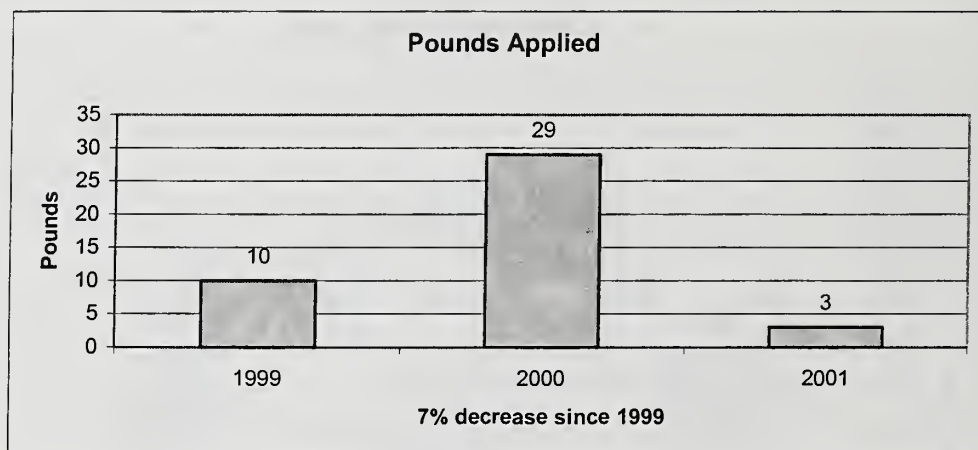
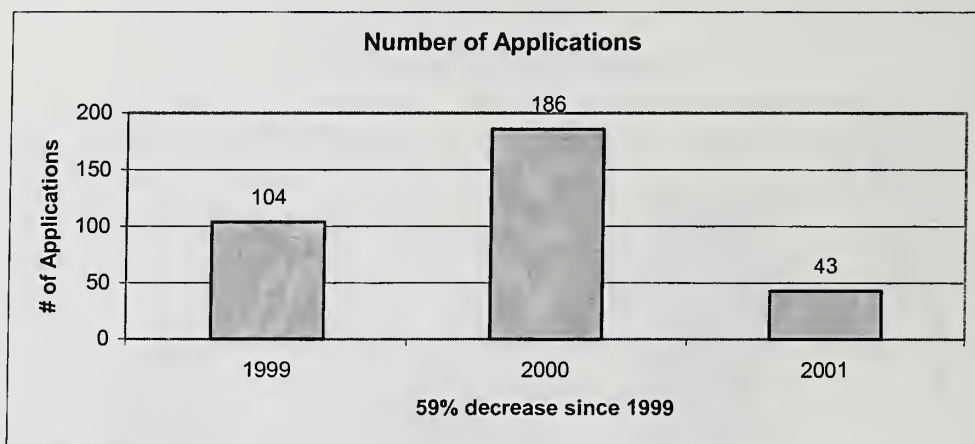
Department of Public Health Use of *Tier 1** Pesticide Products



No Liquid Products Reported

*Tier 1 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts

Department of Public Health Use of *Tier 2** Pesticide Products



* Tier 2 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

Department of Public Health
Use of *Tier 3 Pesticide Products**

No Reported Use of Tier 3 Pesticide Products

* Tier 3 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

Department of Public Works

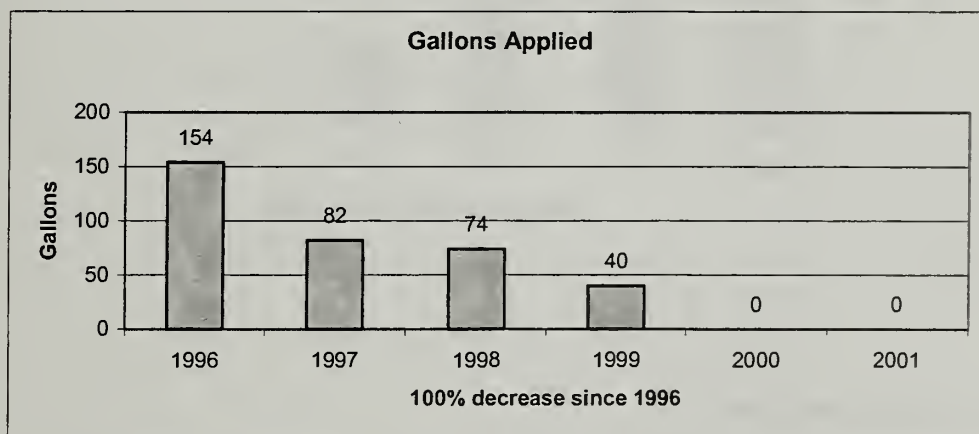
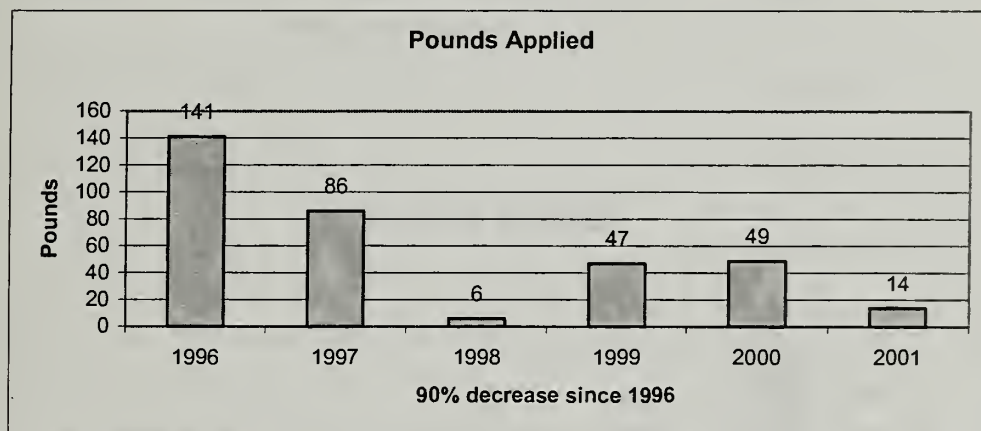
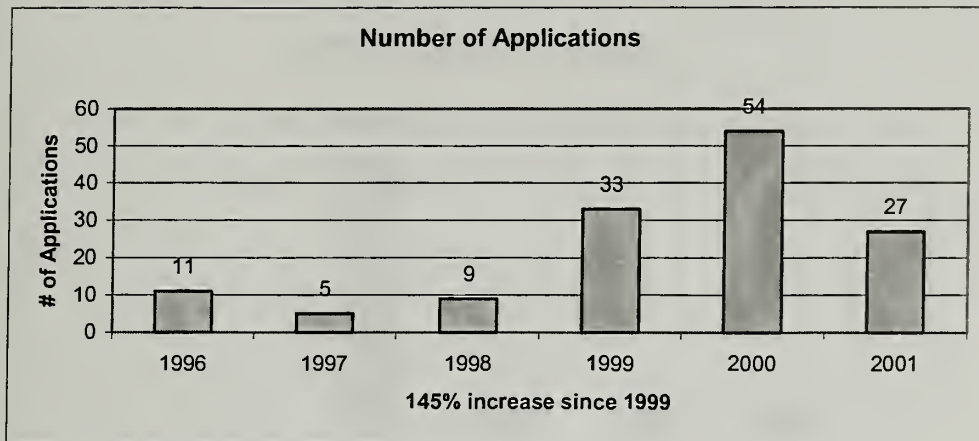
Trends in Amounts Used: The Department of Public Works (DPW) reflected similar trends to other City departments. The number of applications increased by 145% while the use of dry formulations decreased by 90% and there was a continued elimination of the use of liquid pesticides.

DPW, for the second year in a row, has eliminated the use of RoundUp. The DPW continues to eliminate the position of Pesticide Applicator within the Department and relies on mechanical means for controlling weeds in median strips and landscaped areas.

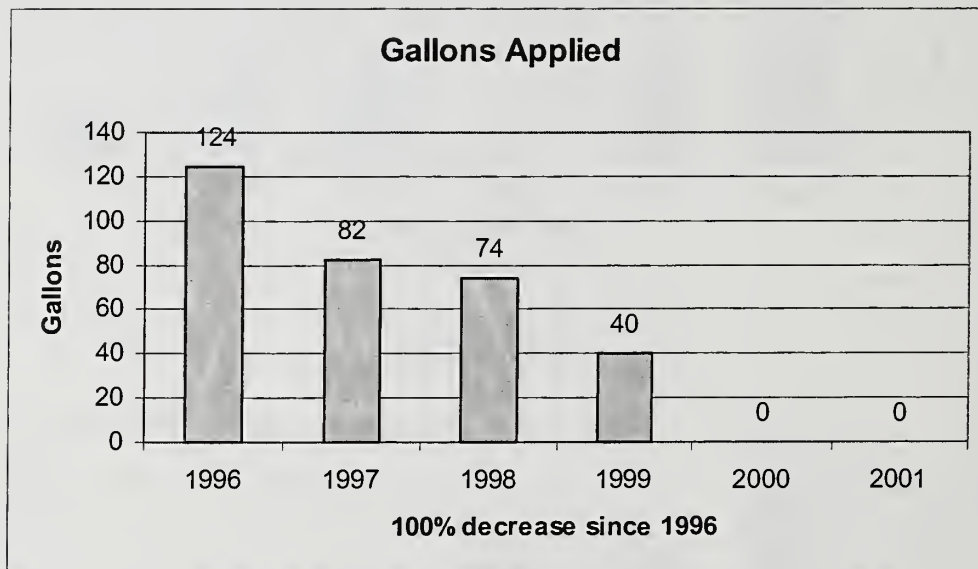
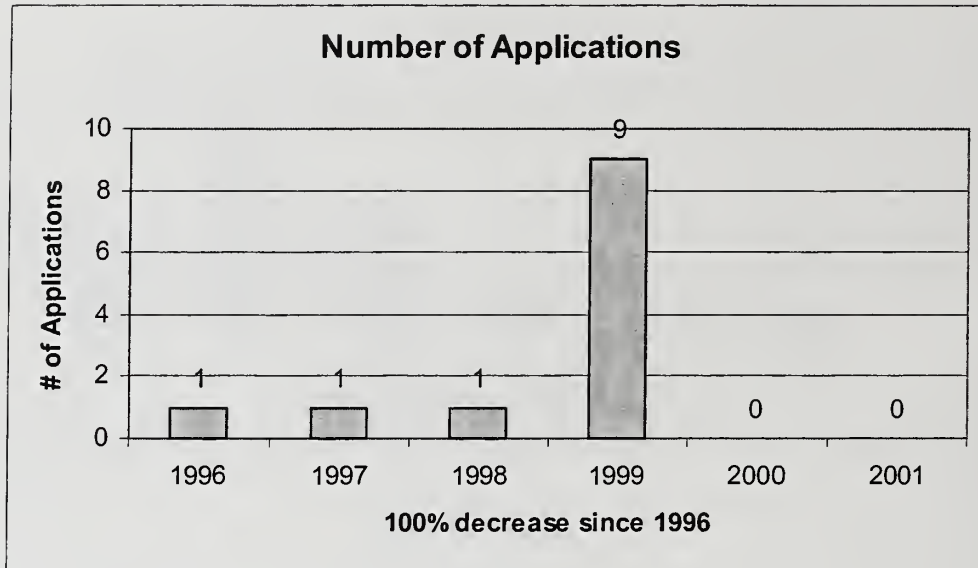
Trends in Toxicity: DPW has eliminated the use products labeled Danger and Warning. The trend in the use of products labeled Caution is similar to that of the citywide trend with a 200% increase in the number of applications, a 82% decrease in the amount of dry formulation used and a continued elimination of all liquid products.

DPW has experienced a 19% increase in the number of applications of Tier 1 pesticide products and a 70% decrease in the amount of dry formulation used. To DPW's credit, they had only one application of Tier 2 pesticide products and no Tier 3 pesticide products.

Department of Public Works Total Use of Pesticide Products (Excluding Bioweed and Suppressa Use)



Department of Public Works RoundUp Use



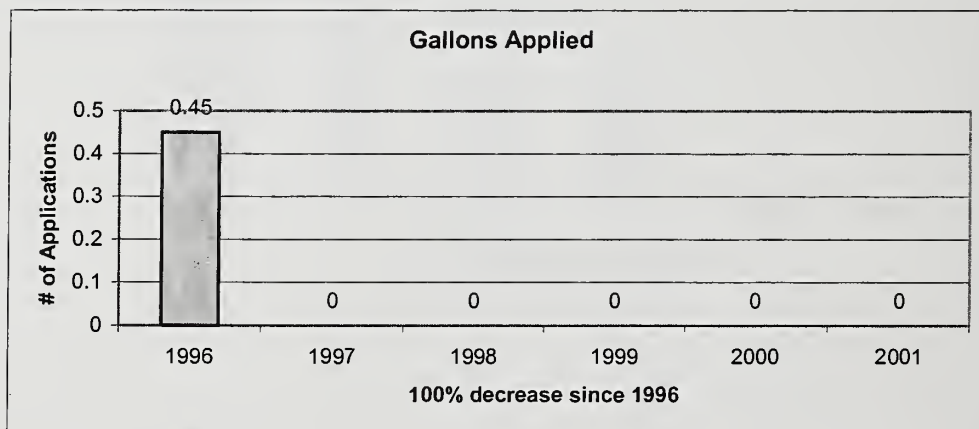
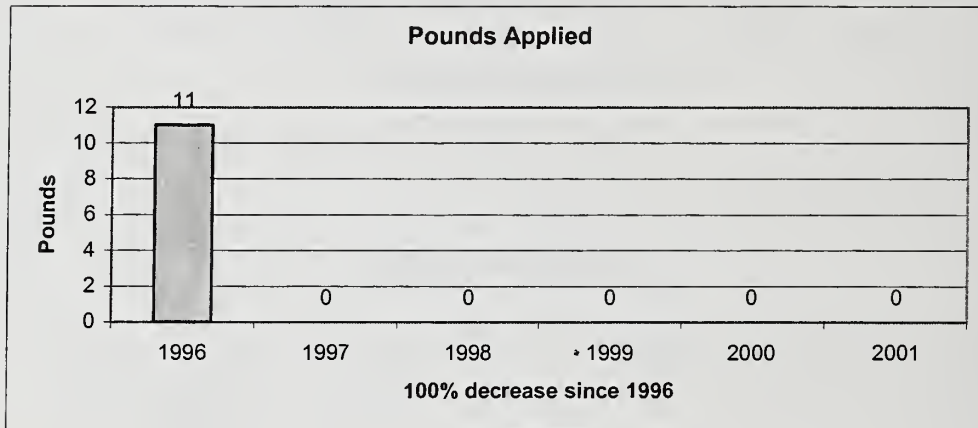
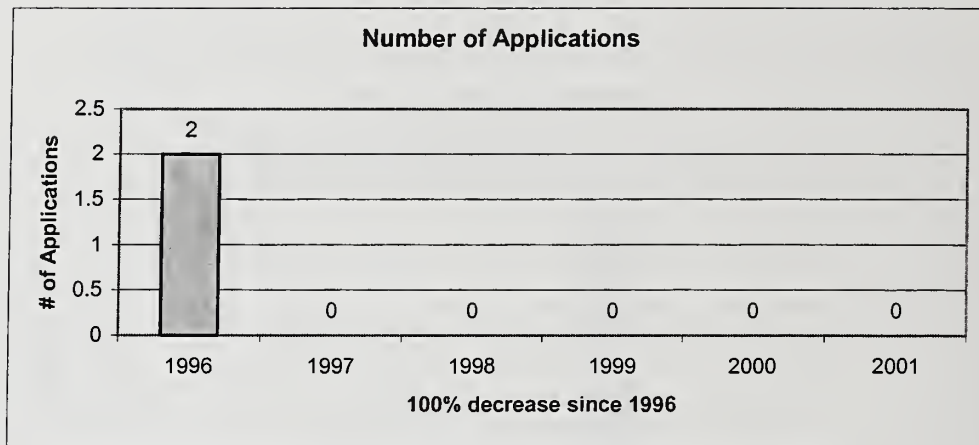
No Dry Products Reported

Department of Public Works
***“Danger”** Products Used**

No Reported Use of Danger Products

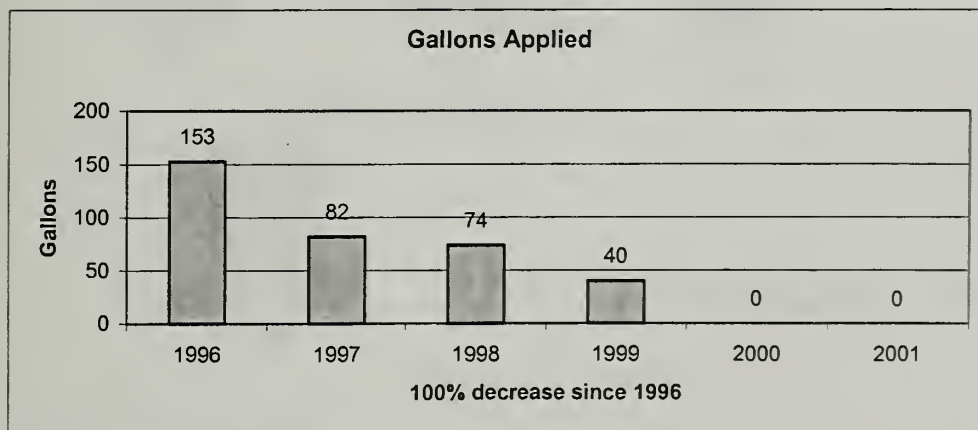
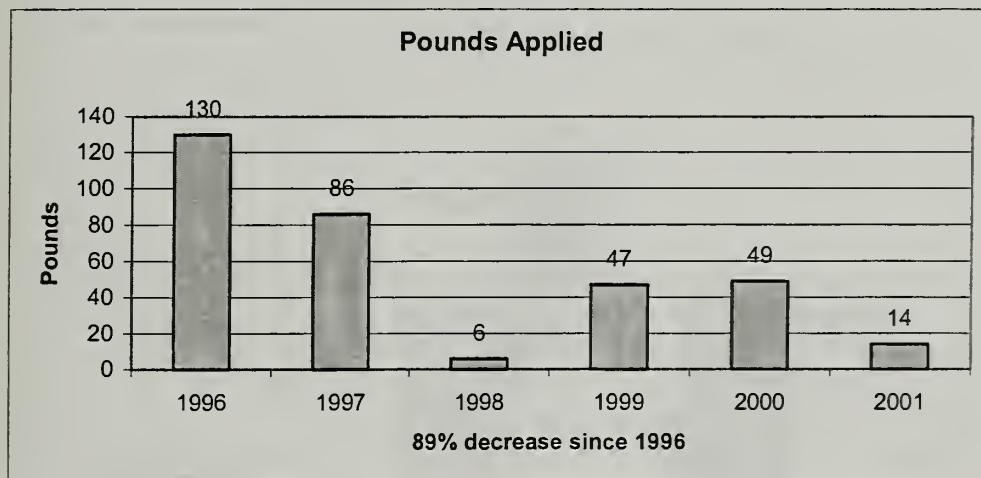
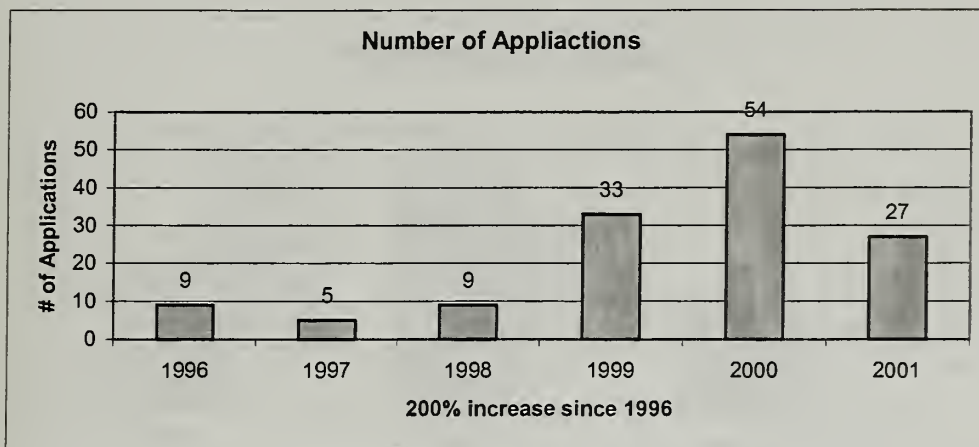
*Danger refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

Department of Public Works “Warning”* Products Used



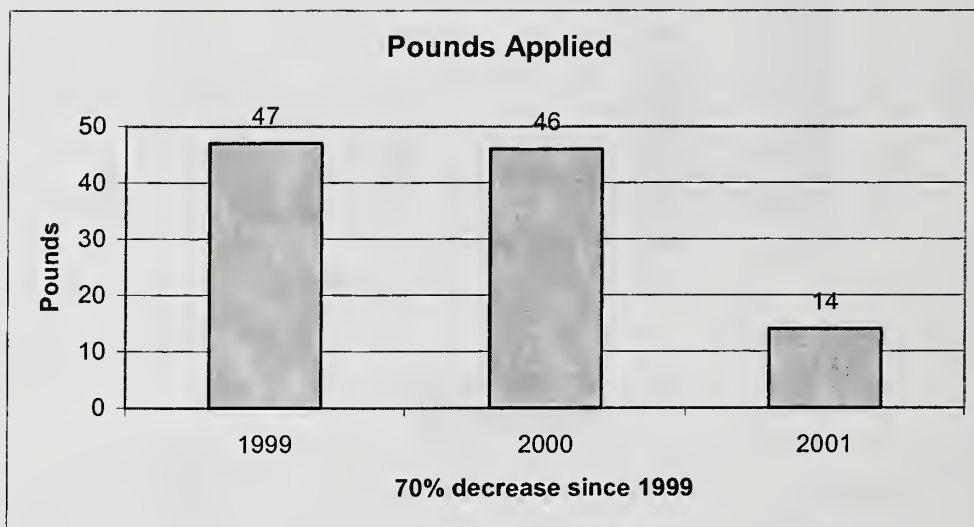
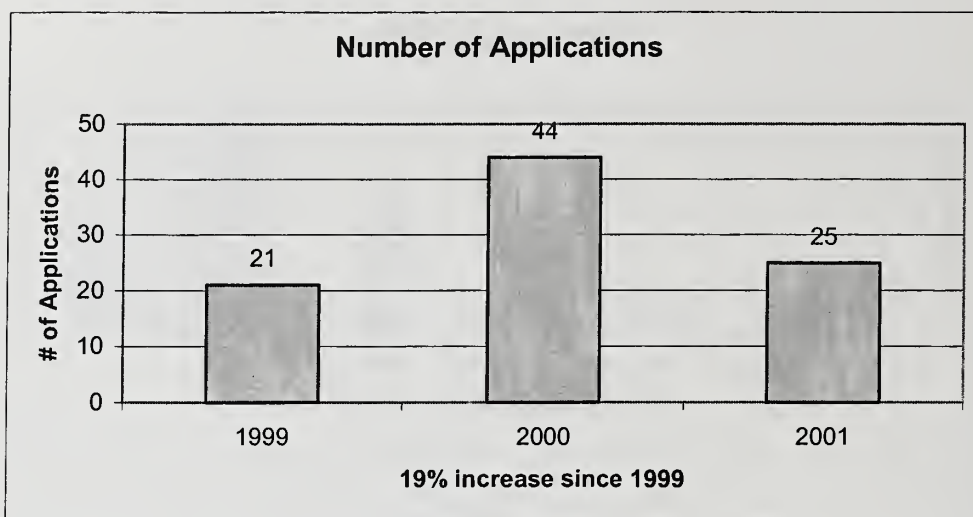
*Warning refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

Department of Public Works "Caution"* Products Used



*Caution refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

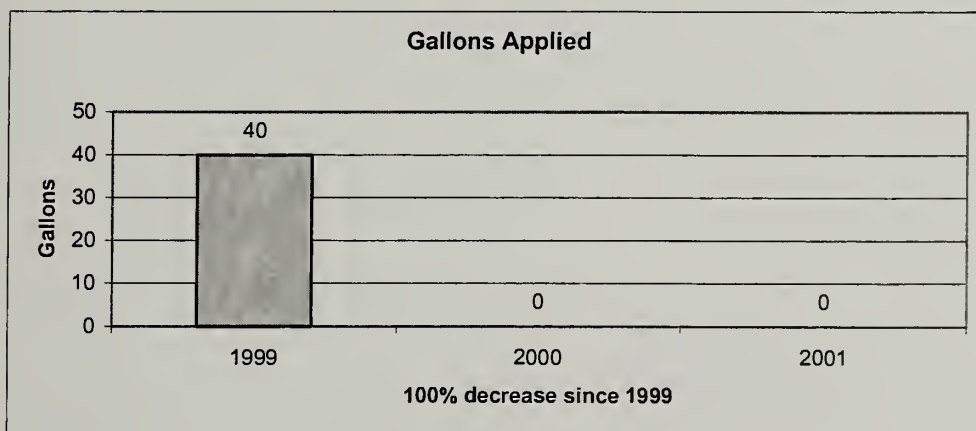
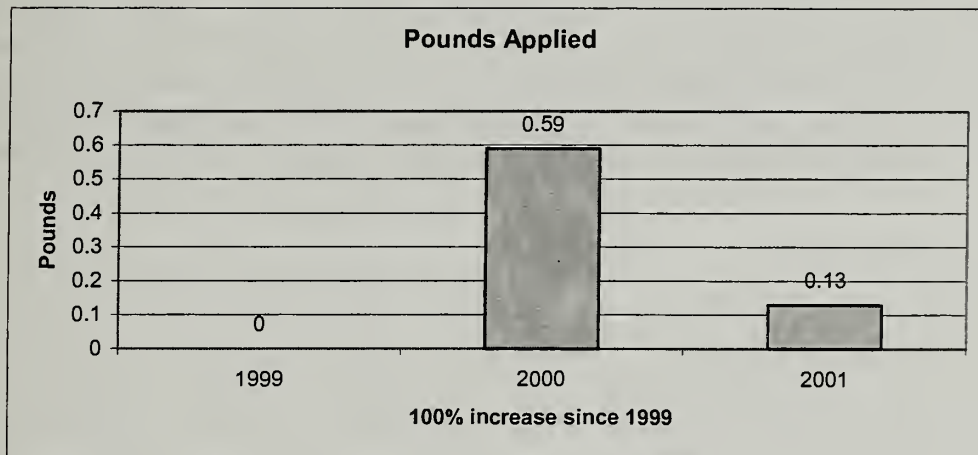
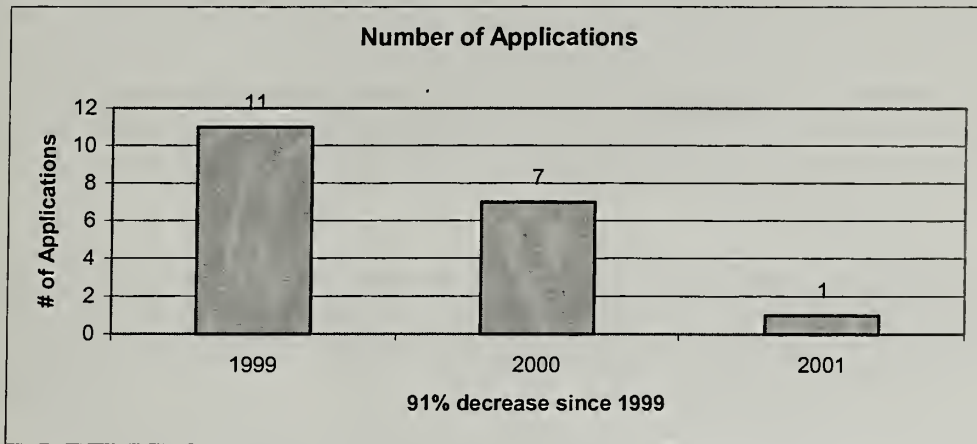
Department of Public Works Use of *Tier 1** Pesticide Products



No liquid *Tier 1* pesticide products reported

* Tier 1 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts

Department of Public Works Use of *Tier 2** Pesticide Products



*Tier 2 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts

Department of Public Works
Use of *Tier 3 Pesticide Products**

No Reported Use of Tier 3 Pesticide Products

*Tier 3 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

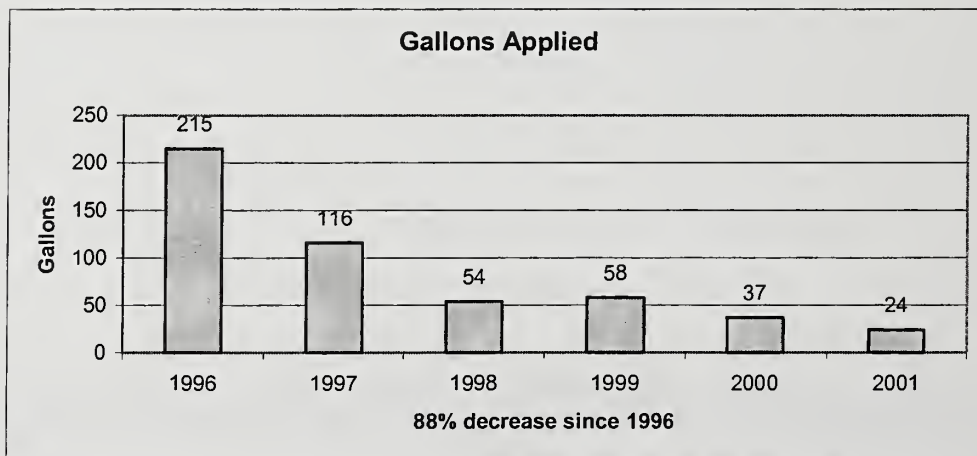
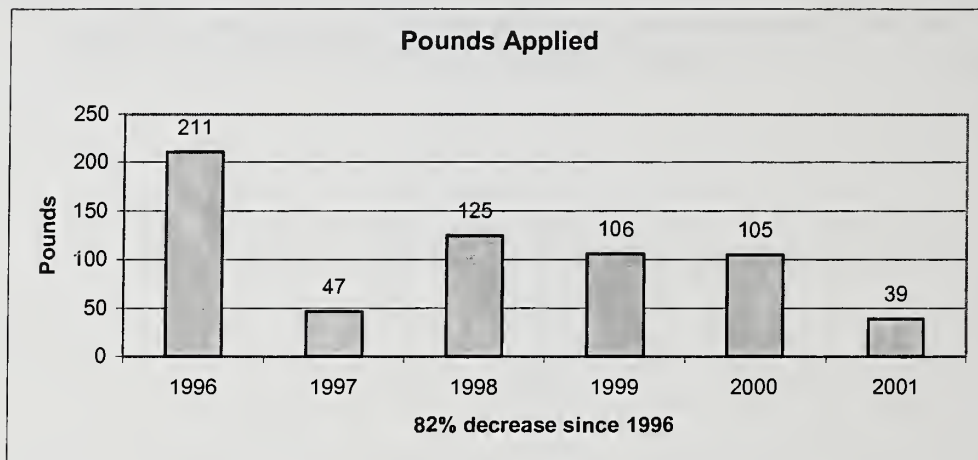
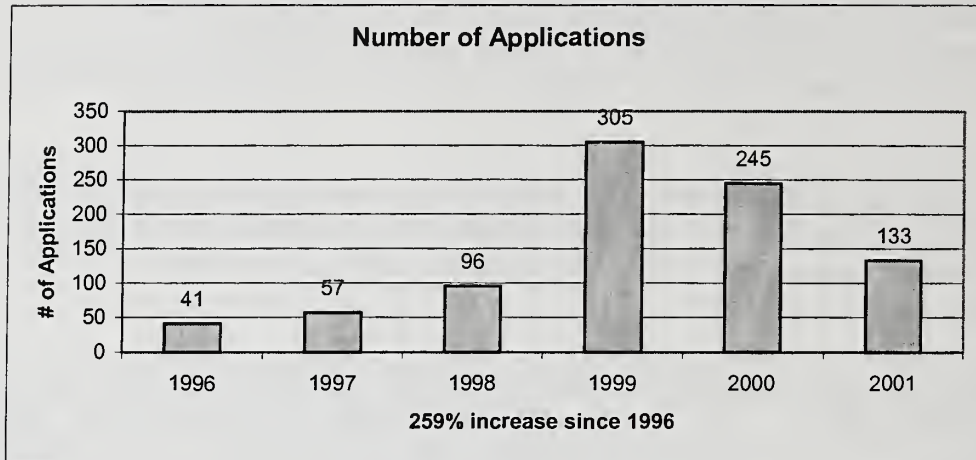
San Francisco International Airport

Trends in Amounts Used: San Francisco's International Airport (Airport) reflected similar trends to other City departments. While the number of applications increased 259% the amounts of pesticides used decreased by 82% and 88% for dry and liquid pesticides respectively. Airport staff have moved away from broadcast applications, they are targeting their use of pesticides and are now using pesticides as a last resort. Although the number of RoundUp applications has increased by 305% the amount has decreased by 90%. Airport staff continue to implement weed prevention efforts including the use of goats.

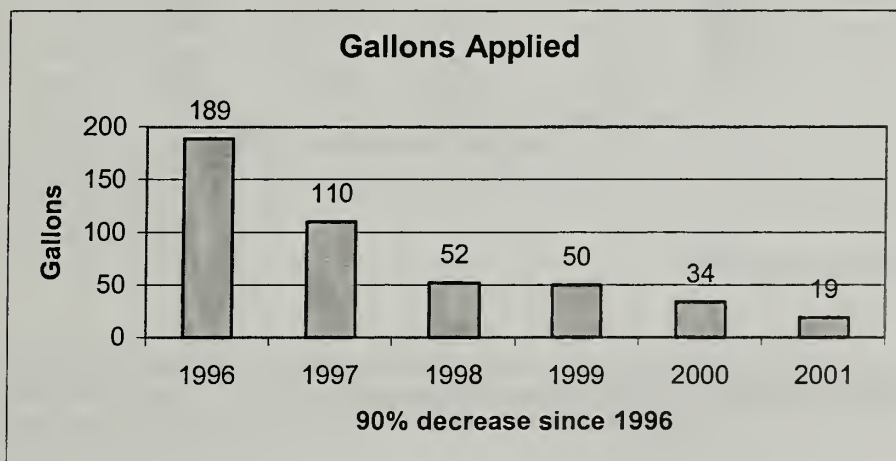
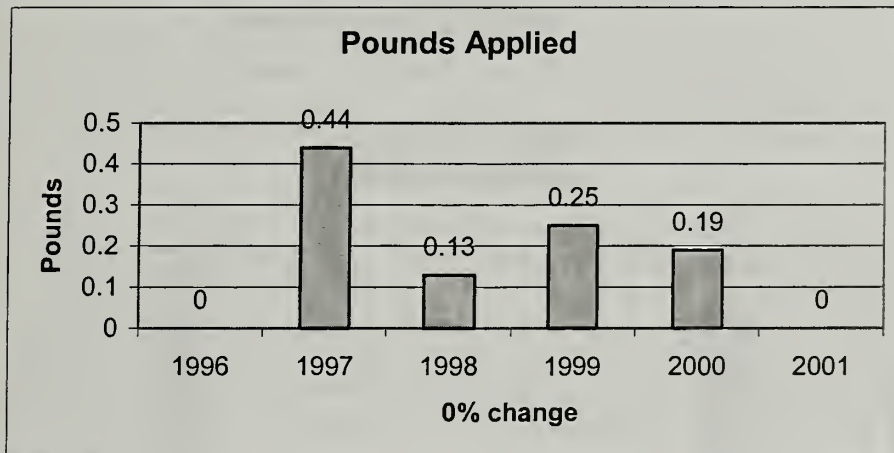
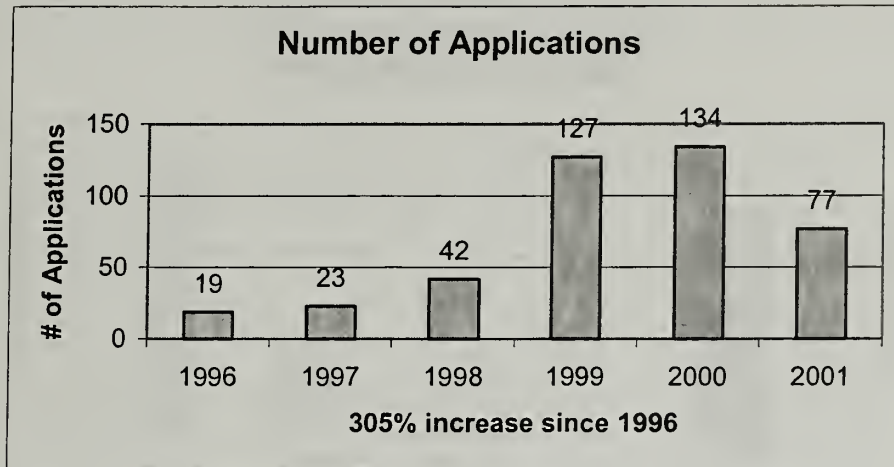
Trends in Toxicity: Airport staff have eliminated the use of products labeled Danger and Warning. The trends in the amount of product labeled Caution has increased by 375% while amounts decreased by 82% for dry pesticides and decreased by 63% for liquid formulations.

The use of products classified as Tier 1 (most hazardous) has significantly decreased from 2000 to 2001. The Airport experienced a 40% decrease in the number of applications of Tier 1 products and a 14% increase in the amount of dry formulations. No liquid formulations were used. The Airport has decreased Tier 2 products by 25% and 58% for dry applications and liquid applications respectively. Also, the Airport has decreased the use of Tier 3 products applications for dry formulations by 62%.

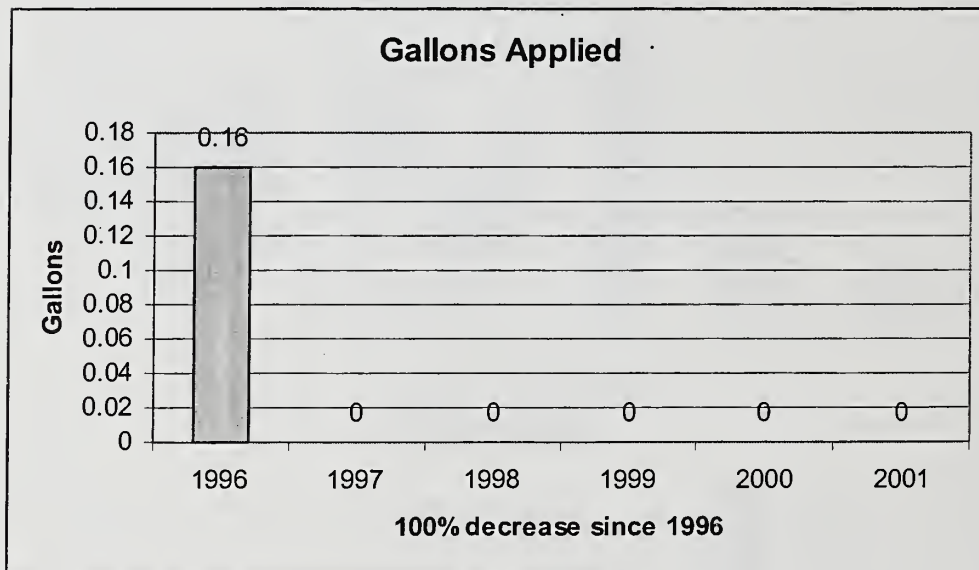
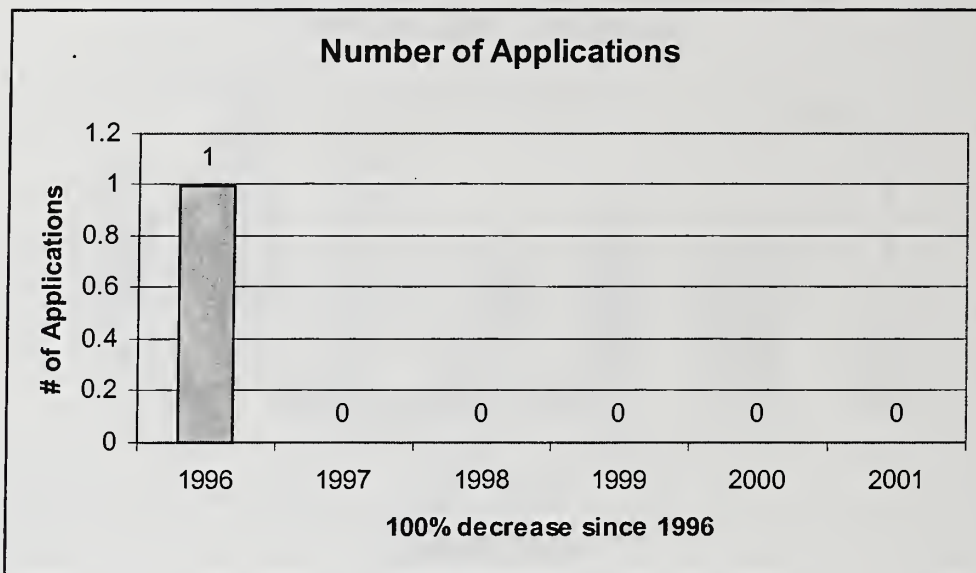
**San Francisco Airport
Total Use of Pesticide Products
(Excluding Bioweed and Suppressa Use)**



San Francisco Airport RoundUp Use



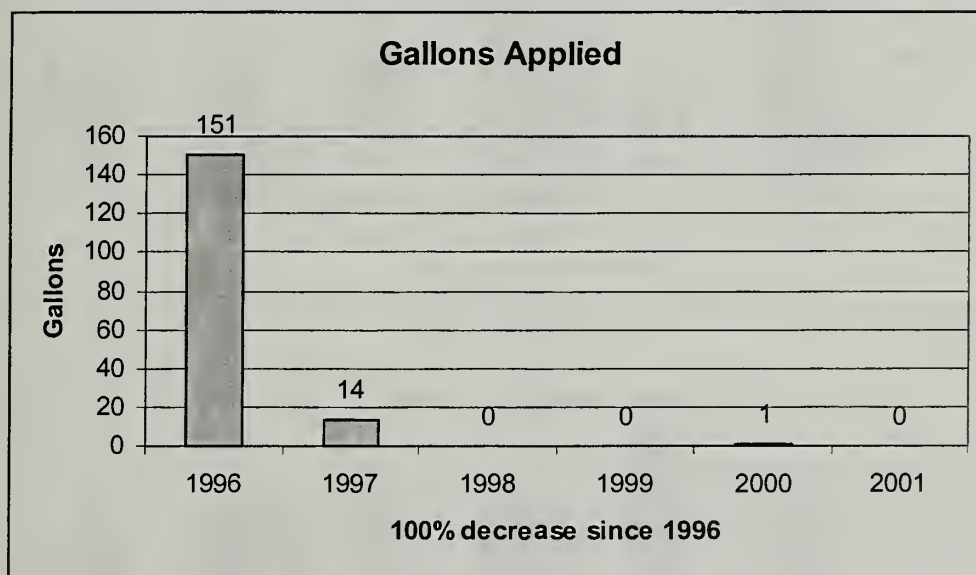
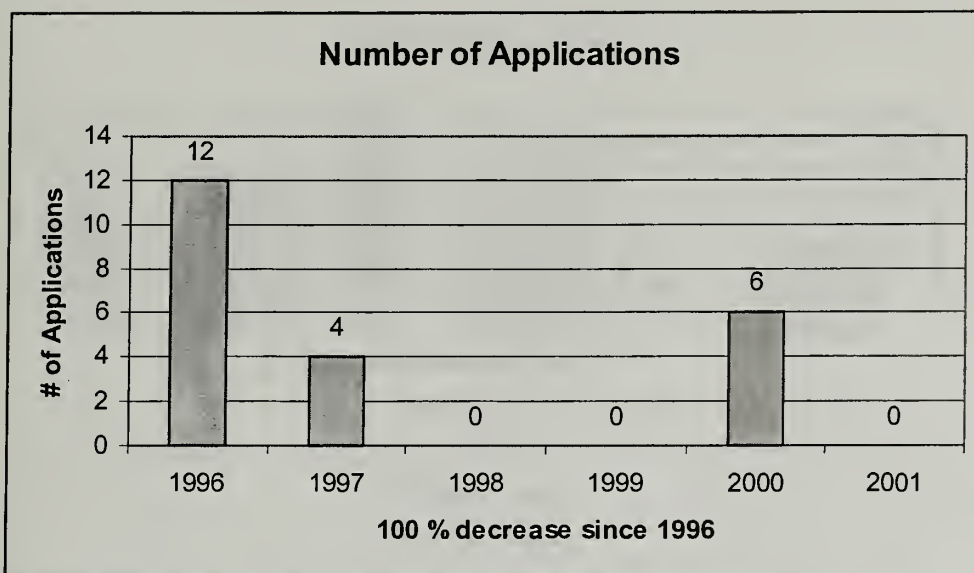
San Francisco Airport “*Danger*”^{*} Products Used



No Dry Products Reported

^{*}Danger refers to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

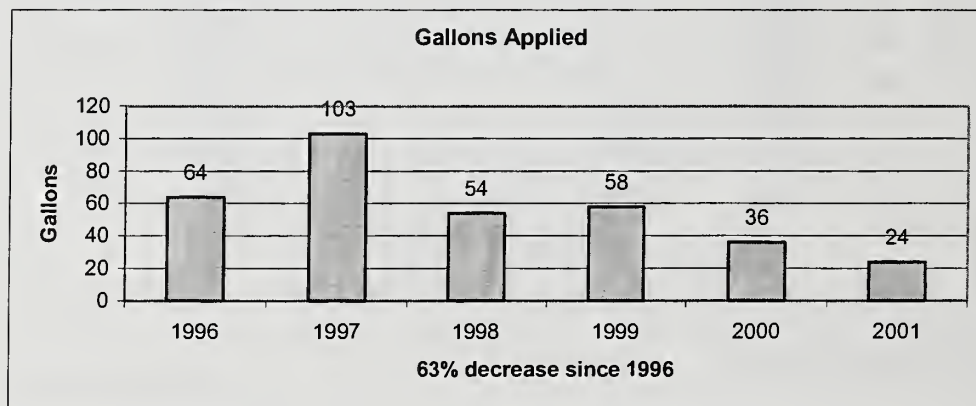
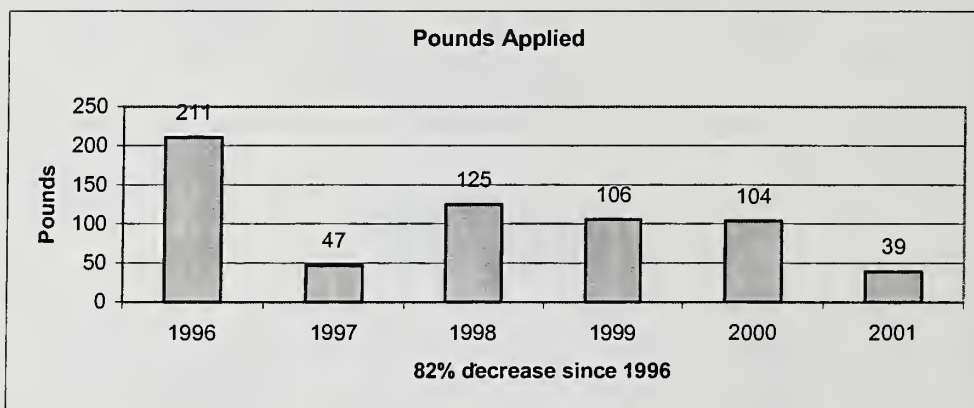
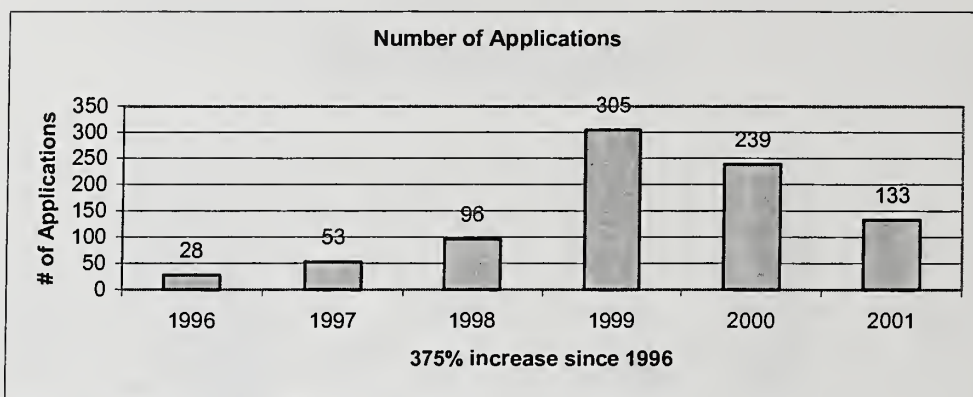
San Francisco Airport “Warning”* Products Used



No Dry Products Reported

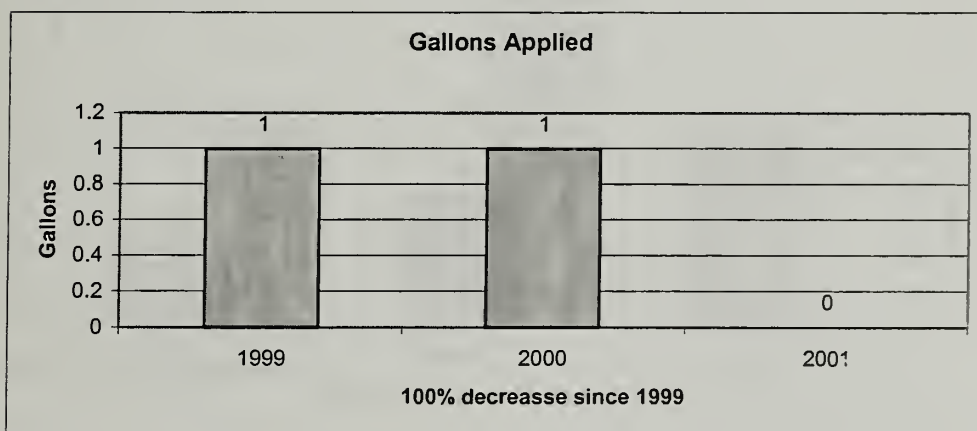
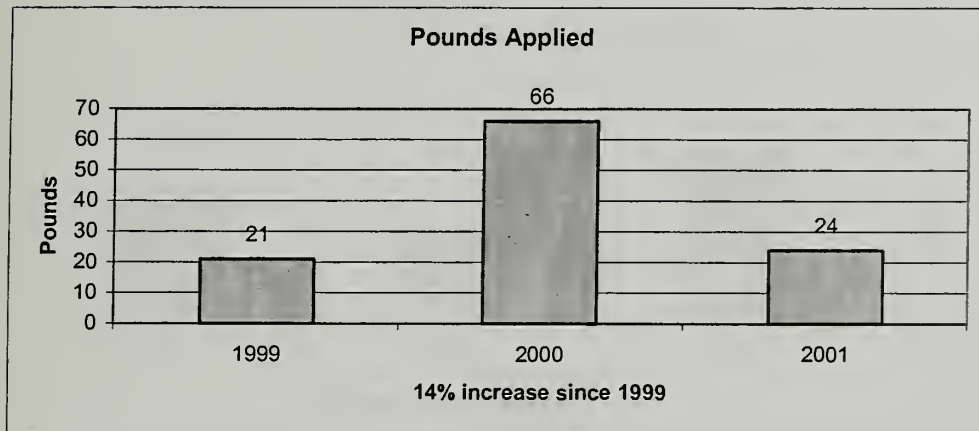
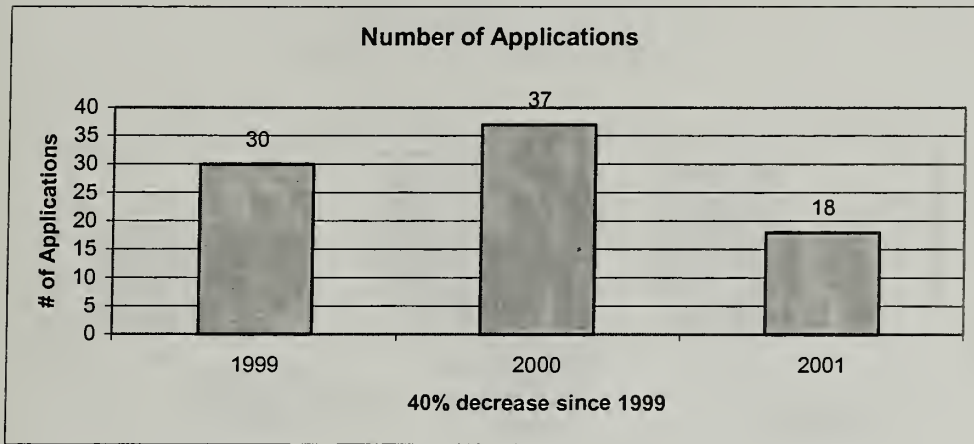
*Warning refers to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

San Francisco Airport “Caution”* Products Used



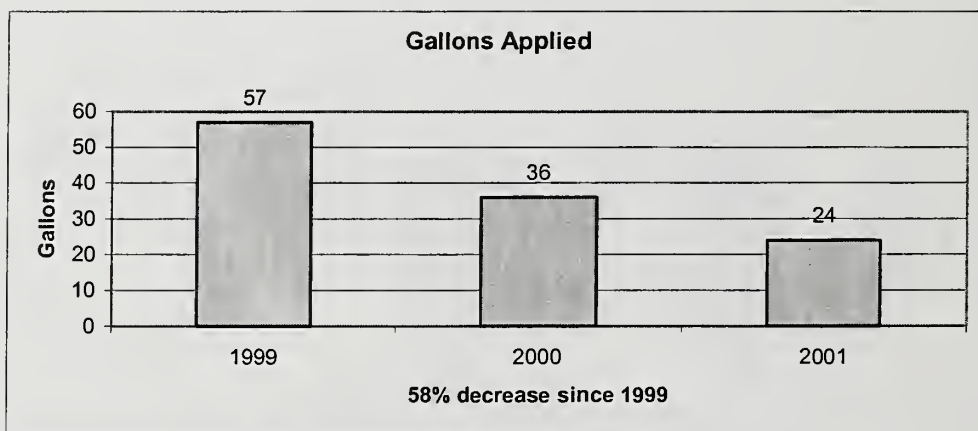
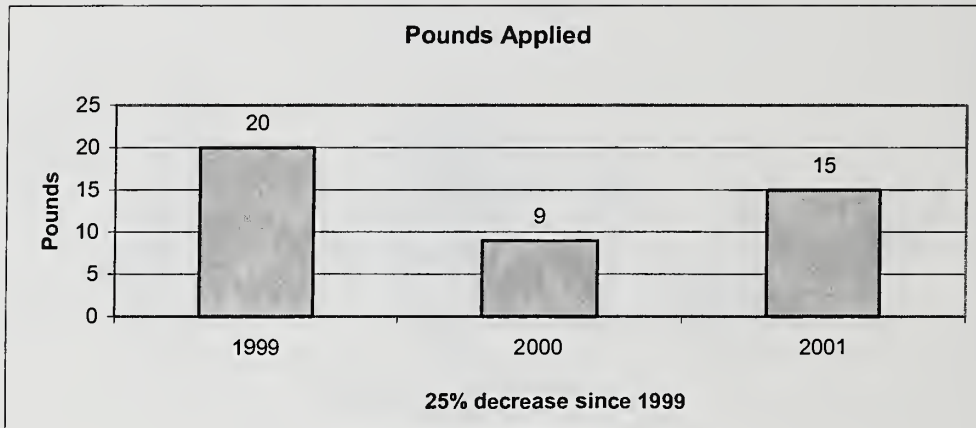
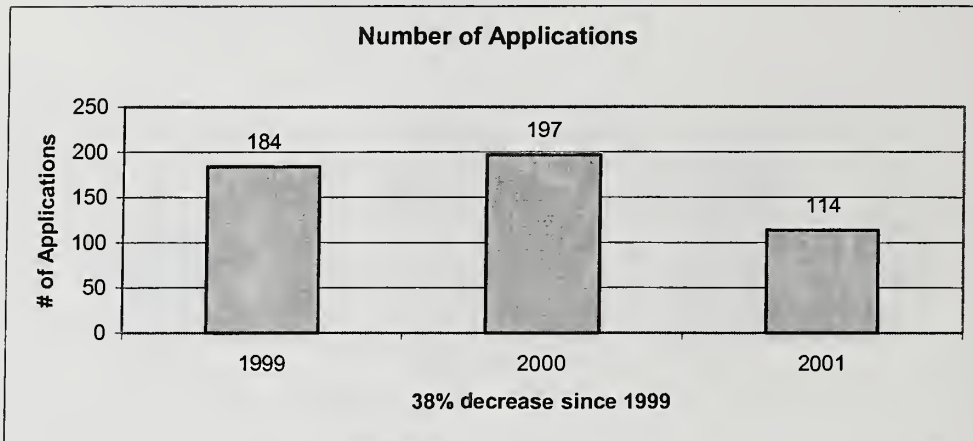
* Caution refers to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

San Francisco Airport Use of *Tier 1** Pesticide Products



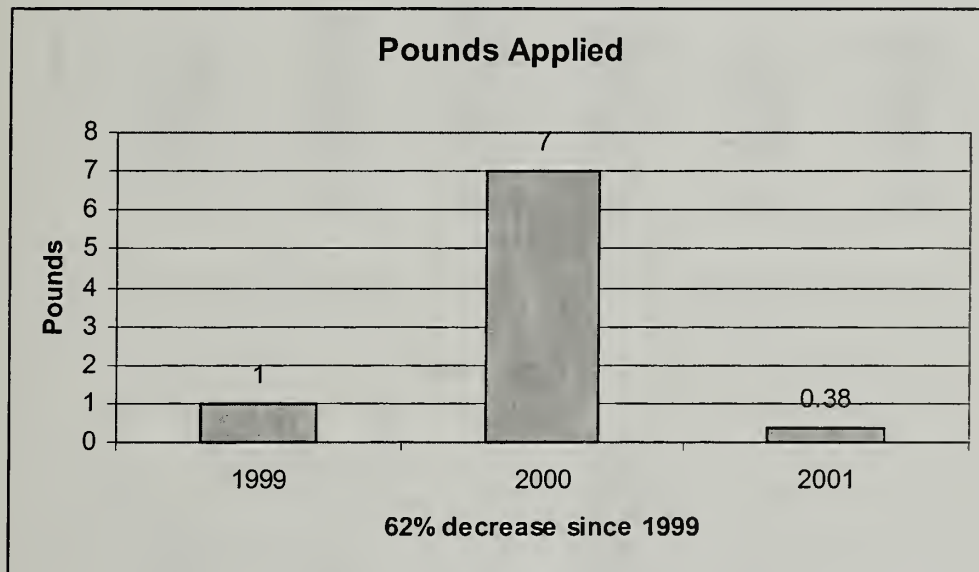
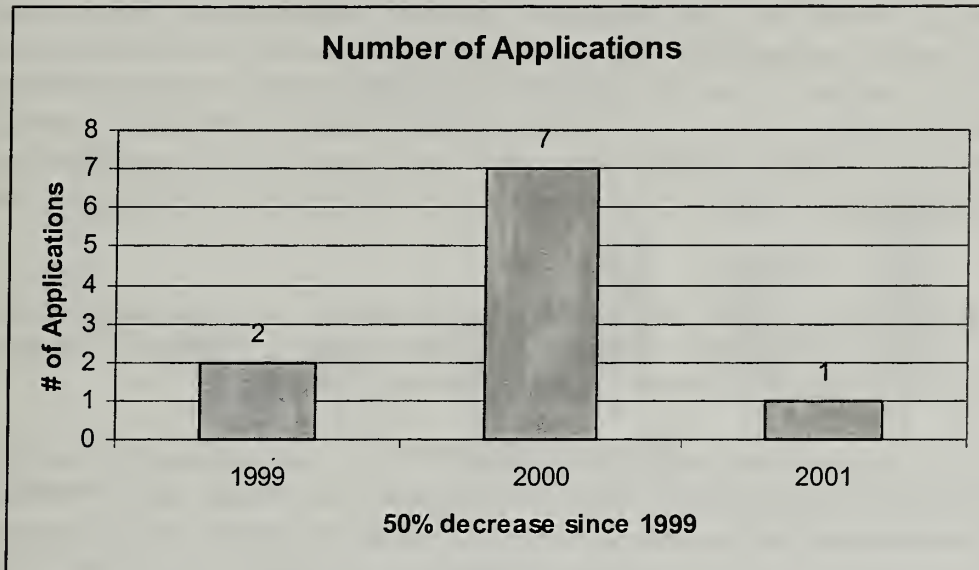
*Tier 1 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts

San Francisco Airport Use of Tier 2* Pesticide Products



* Tier 2 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts

San Francisco Airport Use of *Tier 3** Pesticide Products



No Liquid Products Reported

* Tier 3 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

Port of San Francisco

Trends in Amount Used: The Port reflected similar trends to other City Departments. While the number of applications increased 304% the amounts of pesticides used increased by 10% for dry formulations and showed a 100% decrease for liquid pesticides. The Port staff have continued to use targeted applications when really needed. The use of RoundUp at the Port is reported at zero for 2001. This finding maybe attributable more to lapses in staffing or poor record keeping rather than a fundamental change in the management of weeds on Port property. The Port did not have any gardeners on staff in 2001. Most likely we will note an increase in pesticide use in 2002 because of increased staff.

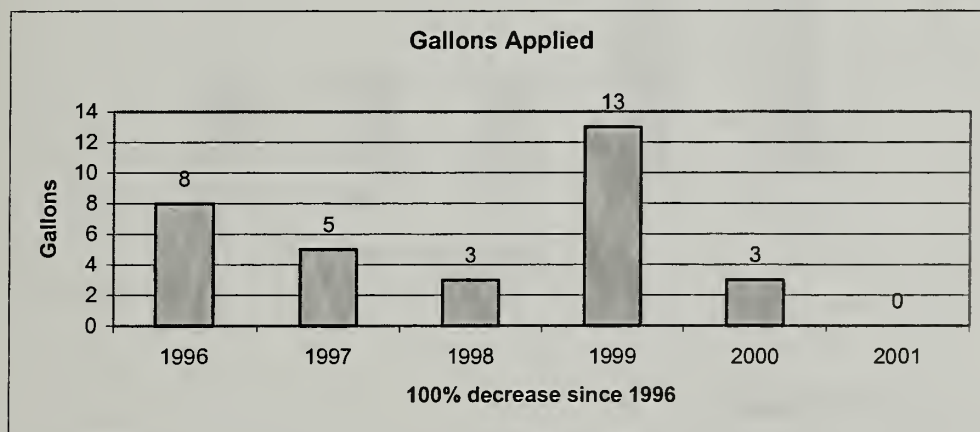
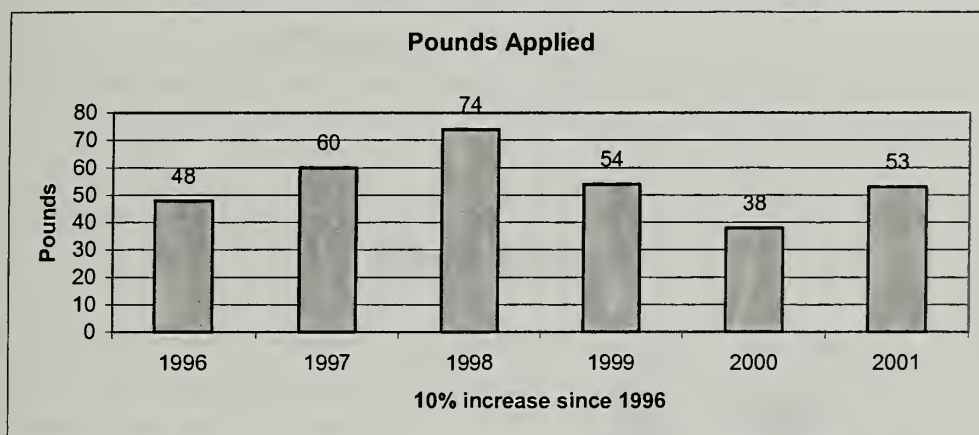
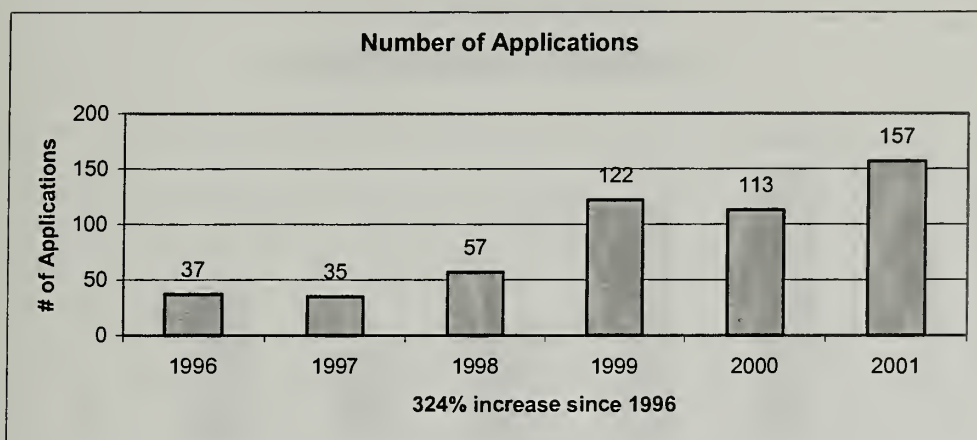
Trends in Toxicity: The Port has never used products labeled Danger and has eliminated the use of products labeled as Warning. The data shows an increase in the amount of product labeled Caution reflects an increased use in rodenticides.

The use of the most hazardous products defined as Tier 1 has increased substantially over the past three years, most likely a result of rodenticide use. There with a 2% decrease in the dry formulations and an elimination of Tier 1 liquid pesticides. In addition there is a decrease in the amount used of dry and liquid Tier 2 pesticides but no Tier 3 pesticides are being used. We encourage the Port to look into replacing the Tier 2 products with those in Tier 3 whenever possible.

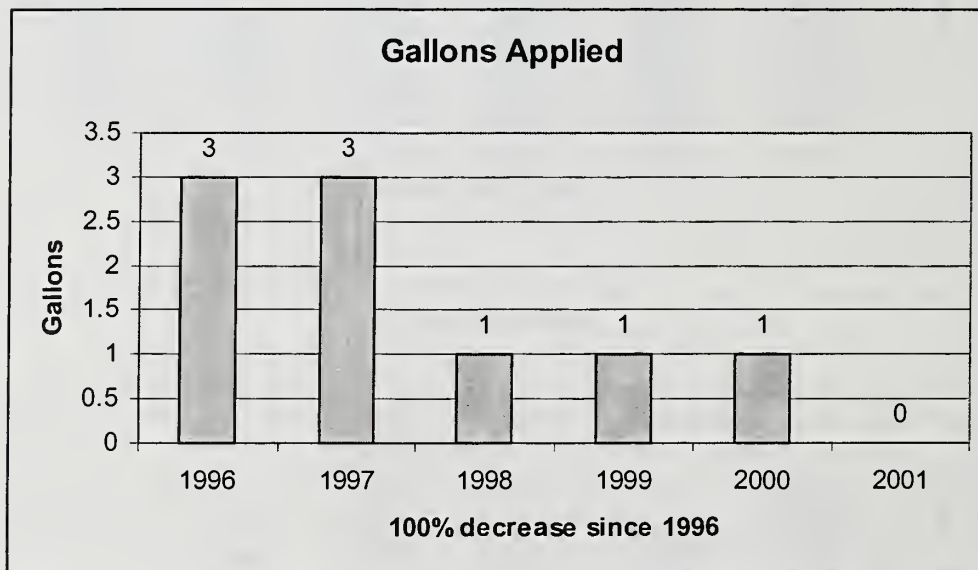
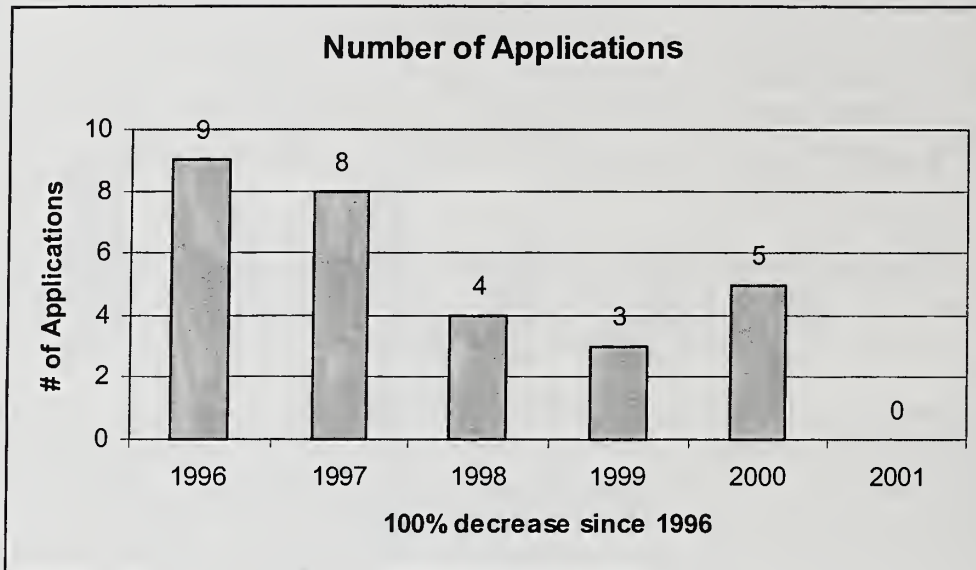
Port of San Francisco

Total Use of Pesticide Products

(Excluding Bioweed and Suppressa Use)



Port of San Francisco RoundUp Use



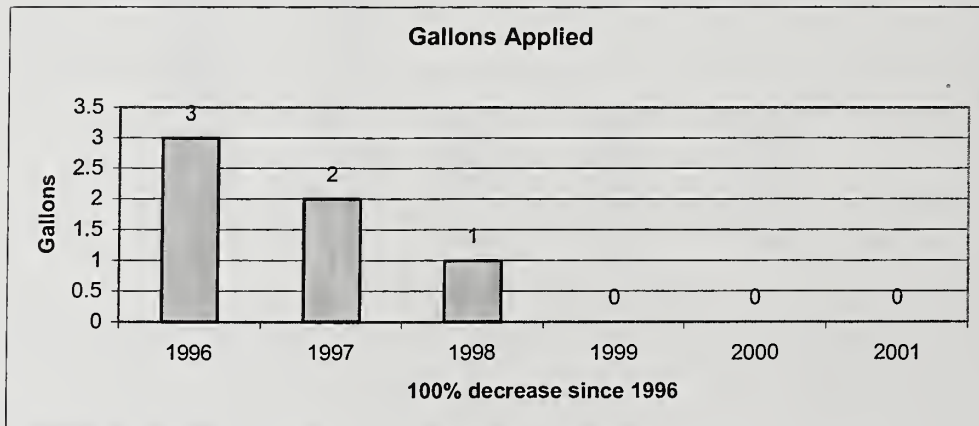
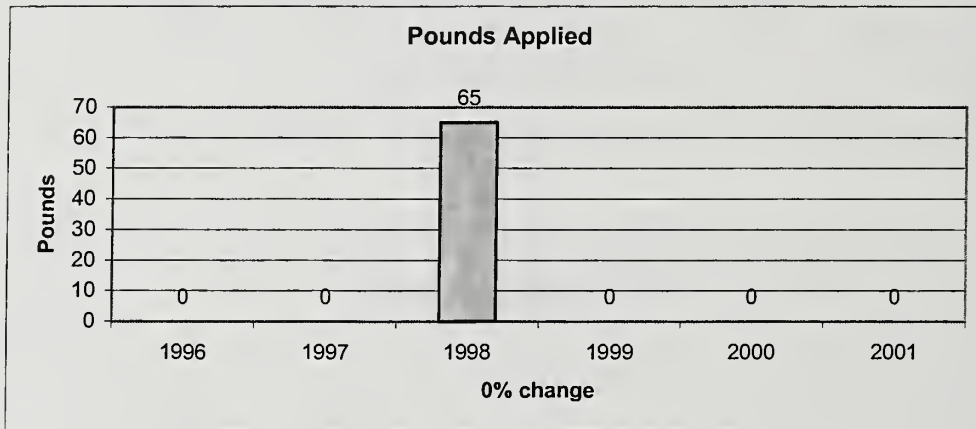
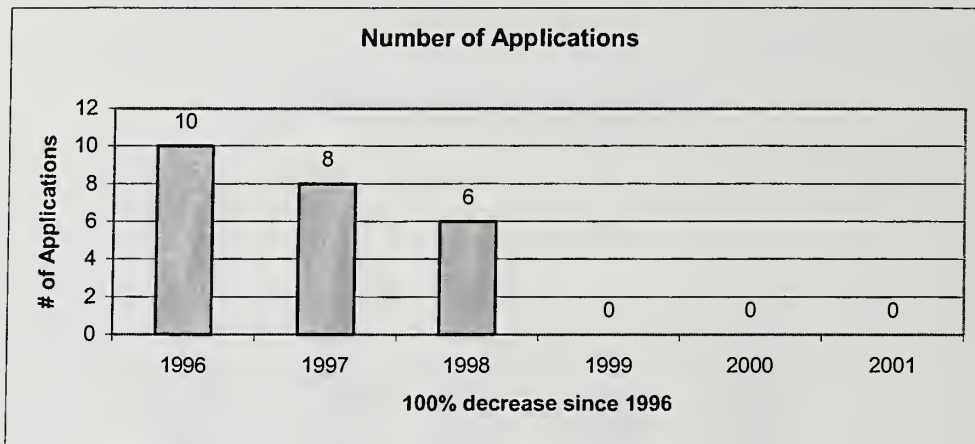
No Dry Products Reported

Port of San Francisco
***"Danger"** Products Used**

No Reported Use of Danger Products

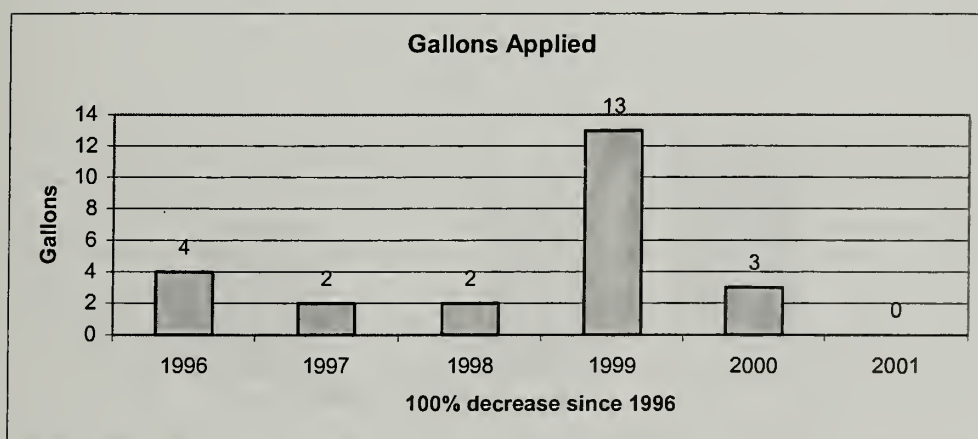
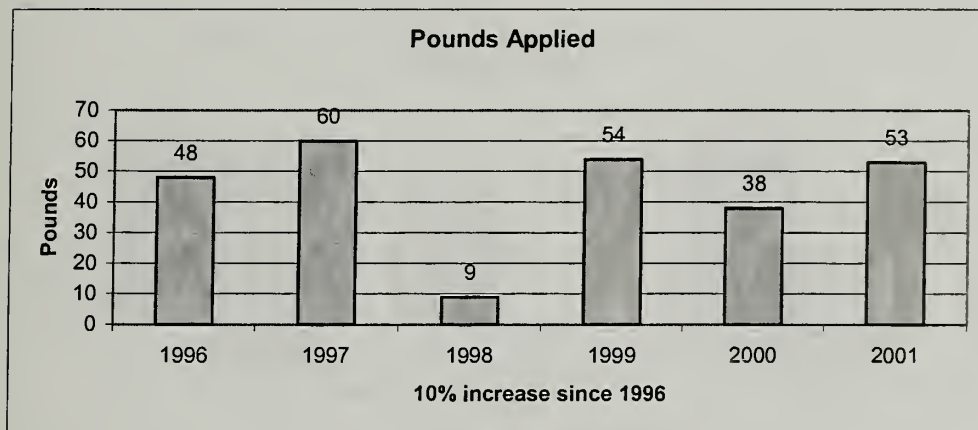
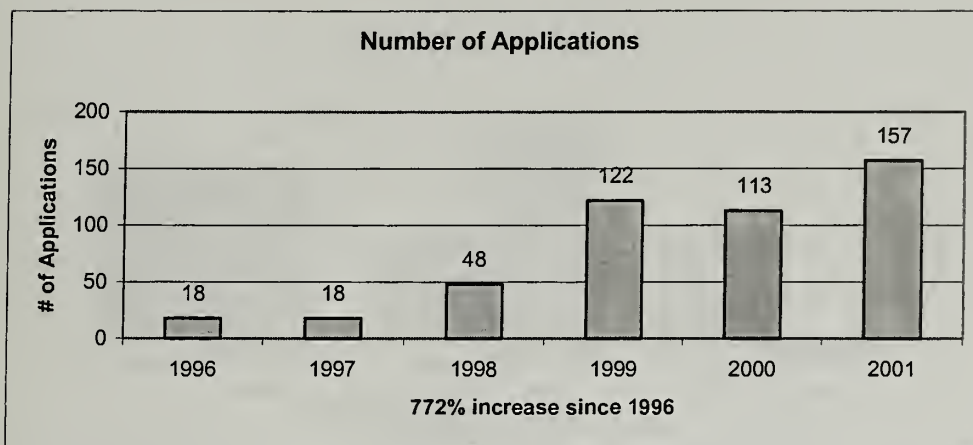
*Danger refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

Port of San Francisco “Warning”* Products Used



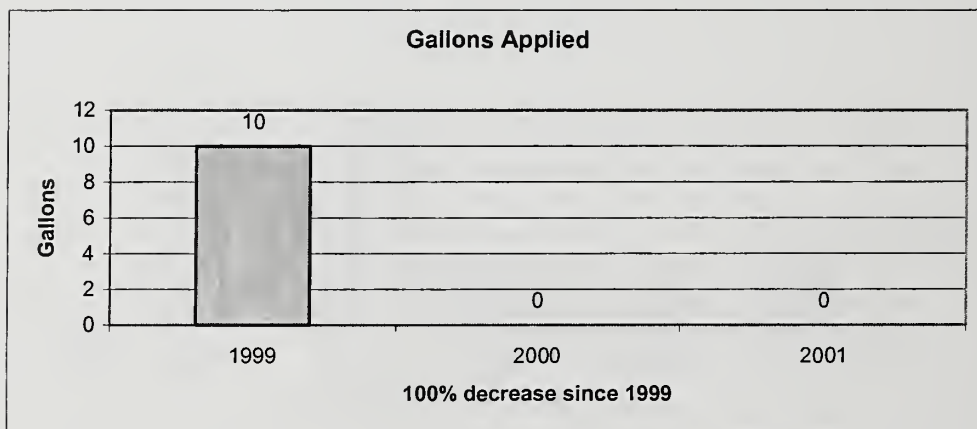
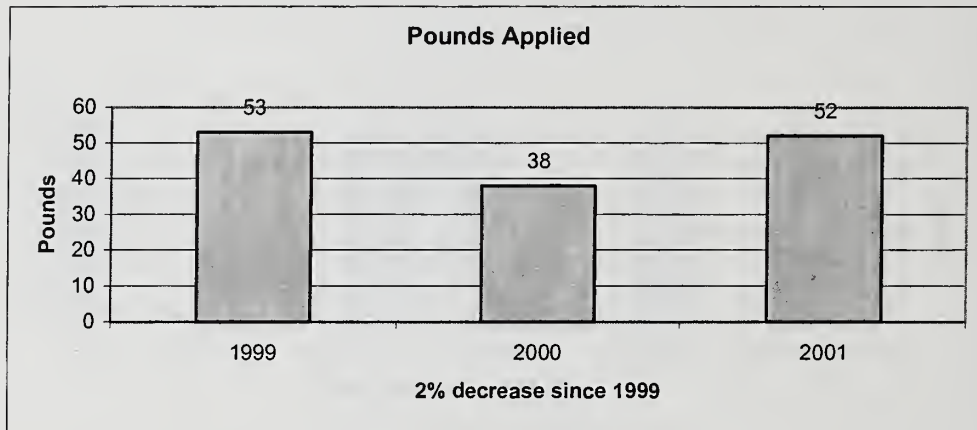
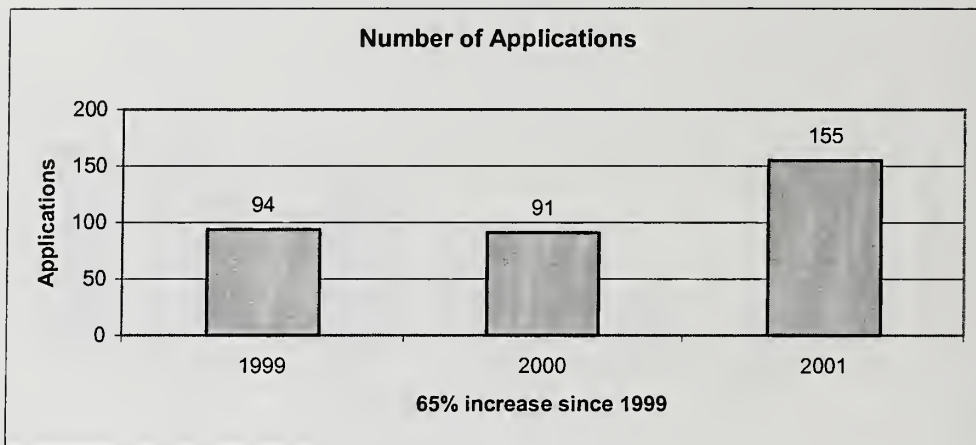
* Warning refers to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

Port of San Francisco "Caution"* Products Used



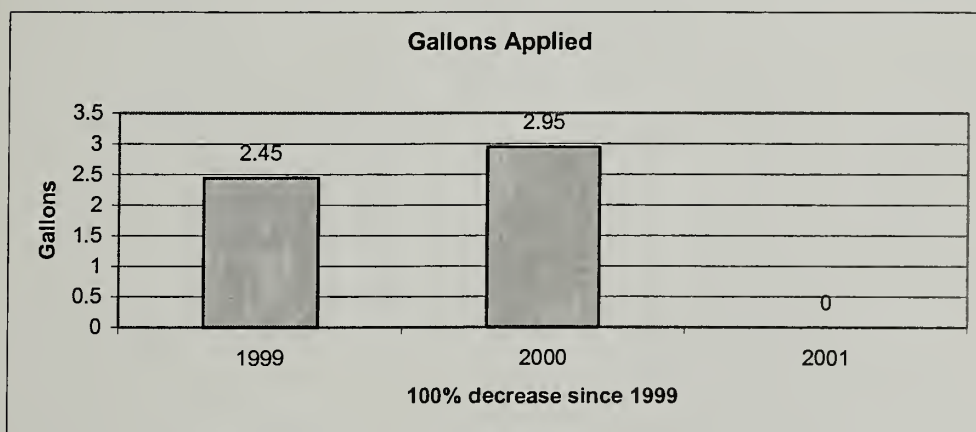
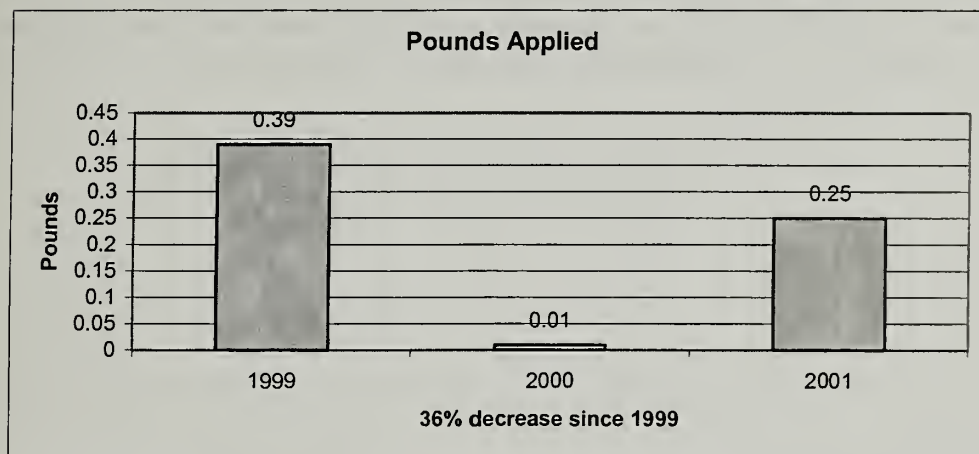
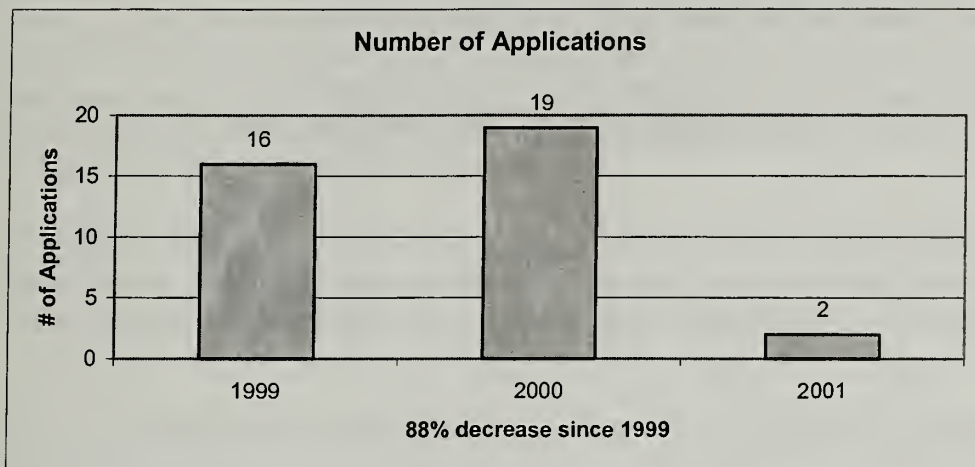
*Caution refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

Port of San Francisco Use of "Tier 1"* Pesticide Products



*Tier 1 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

Port of San Francisco Use of "Tier 2"* Pesticide Products



* Tier 2 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts

**Port of San Francisco
Use of “Tier 3”* Pesticide Products**

No Reported Use of Tier 3 Pesticide Products

*Tier 3 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

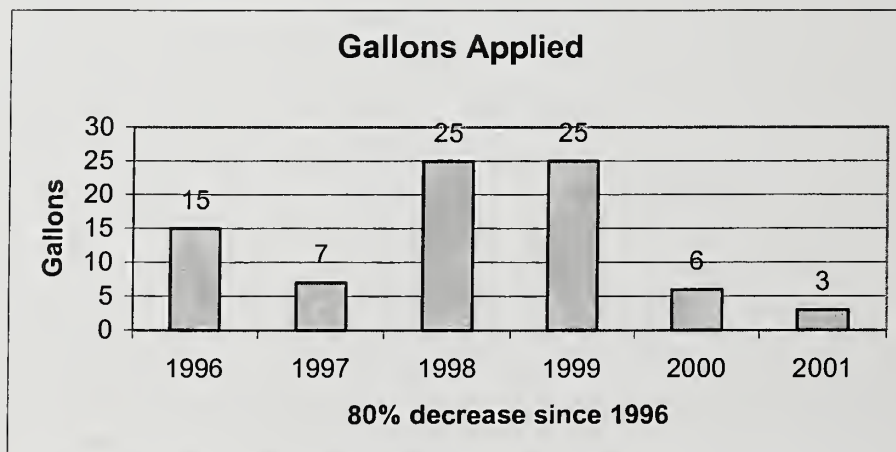
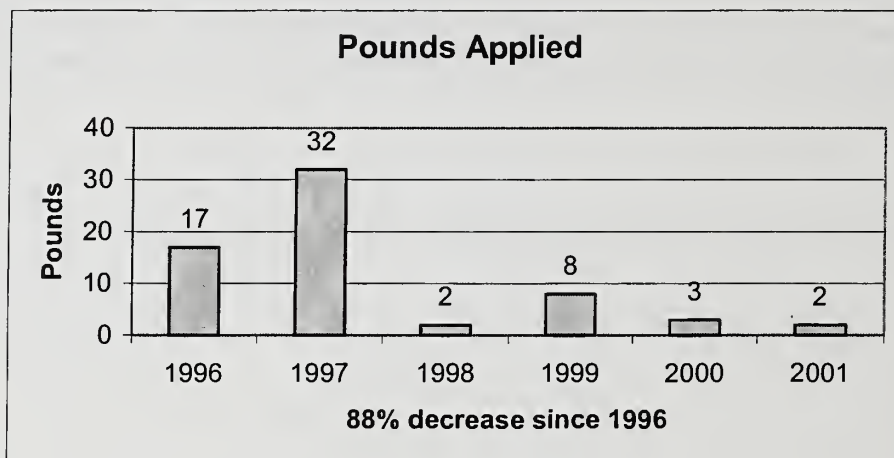
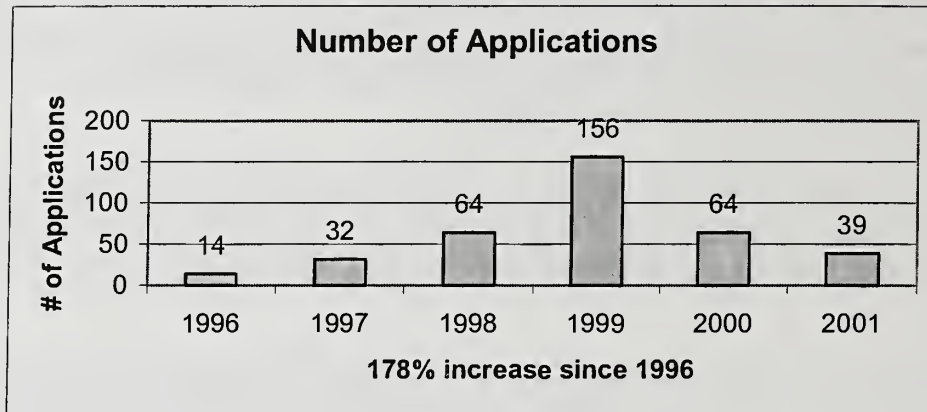
Department of Transportation

Trends in Amounts Used: The Department of Transportation, MUNI, reflected similar trends to other City Departments. While the number of applications rose 178% the amounts of pesticides used declined by 88% and 80% for dry and liquid pesticides respectively. Again, MUNI staff have moved away from broadcast applications and are targeting their use of pesticides when really needed. Nowhere is the trend more apparent than in the use of RoundUp for MUNI. While the 3100% increase in the numbers of RoundUp applications may be a result of poor record-keeping in earlier years the 73% drop in RoundUp use seems to be a solid trend.

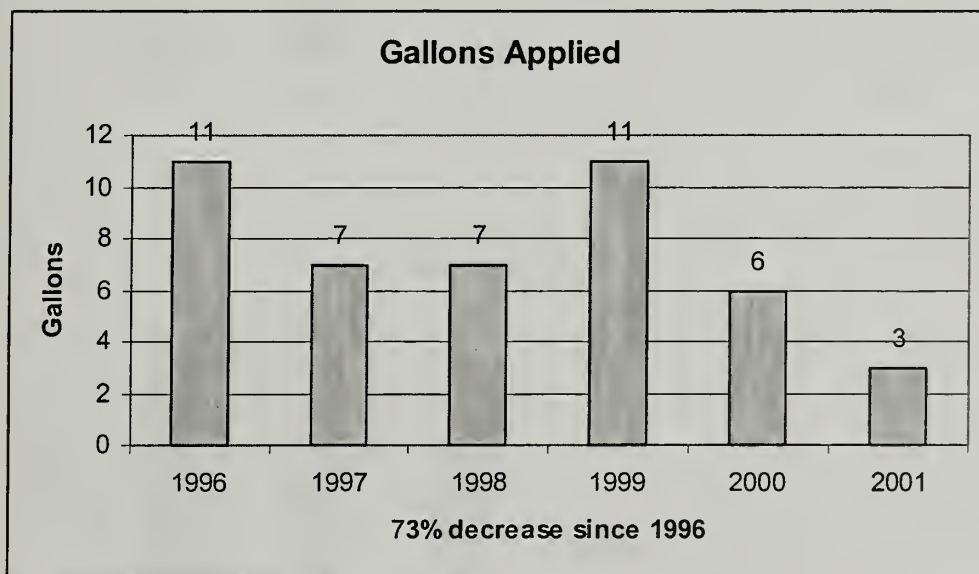
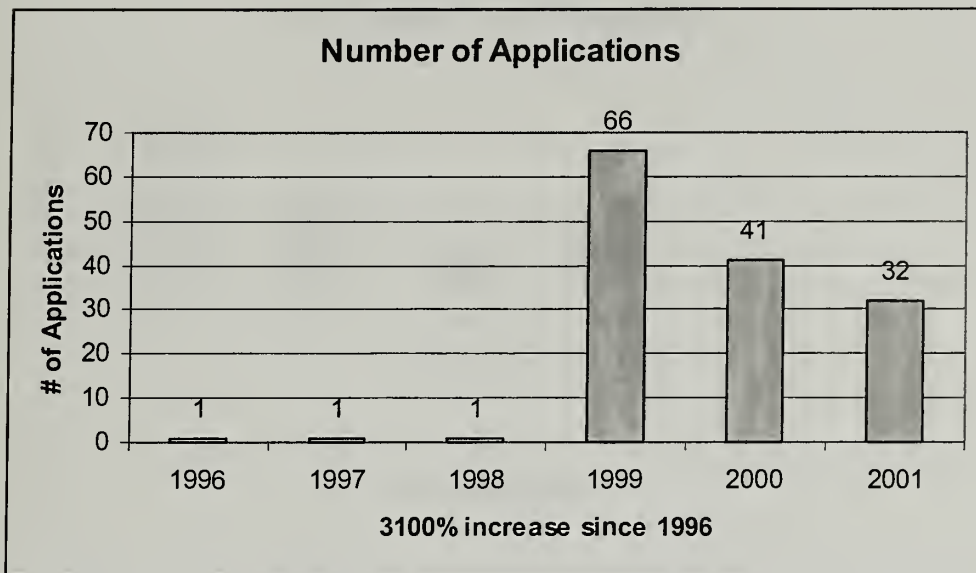
Trends in Toxicity: MUNI staff never used products labeled Danger and have now eliminated the use of products labeled as Warning. For the past three years there has been a constant trend of a decrease in the amount of Caution pesticides used by MUNI staff.

The use of the most hazardous products defined as Tier 1 has dropped off significantly with an 86% decline in the dry pesticides and the elimination of Tier 1 liquid pesticides. We hope to see these trends continue. MUNI has experienced a clear drop in the use of Tier 2 products but is not using any product designated as Tier 3. We would encourage MUNI staff to look into replacing Tier 2 products with those in Tier 3 whenever possible.

**Department of Transportation
Total Use of Pesticide Products
(Excluding Bioweed and Suppressa Use)**



Department of Transportation RoundUp Use



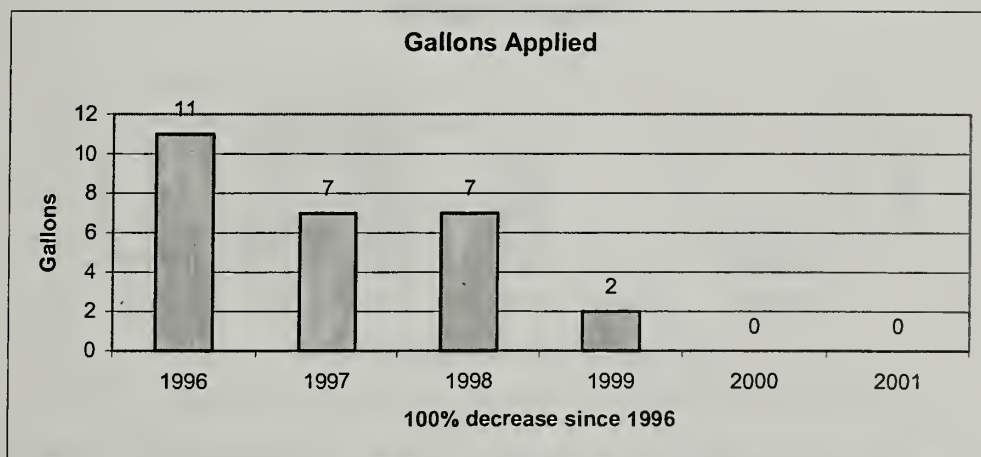
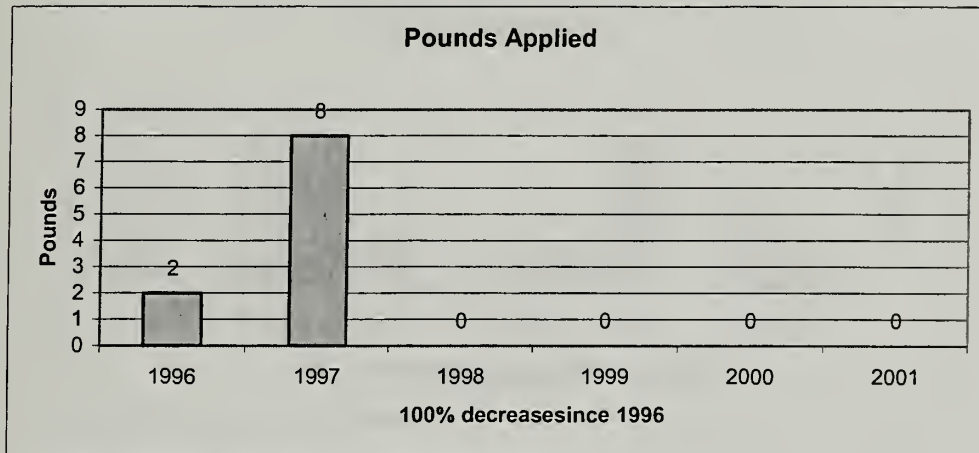
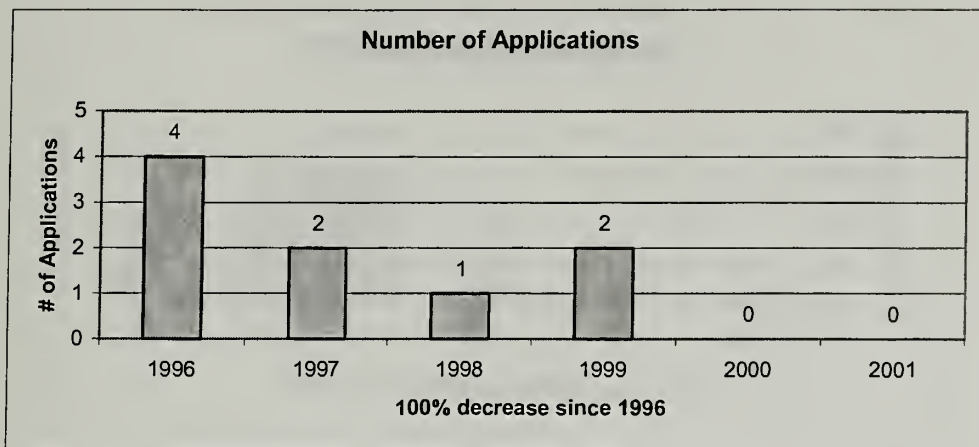
No Dry Products Reported

Department of Transportation
***“Danger”** Products Used**

No Reported Use of Danger Products

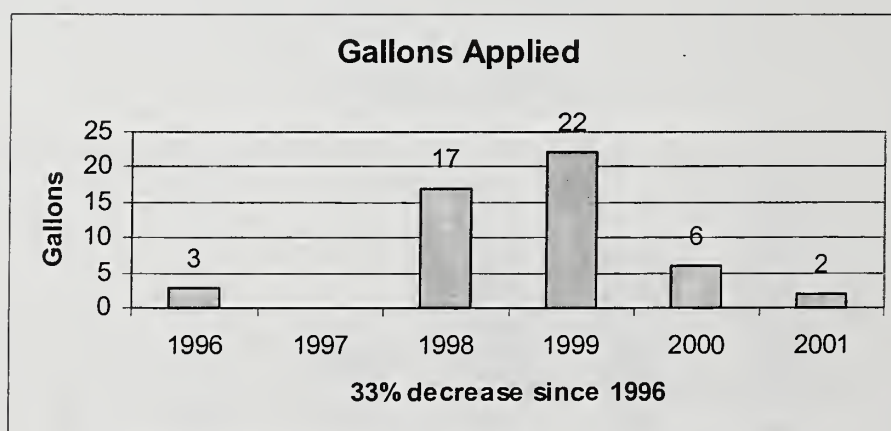
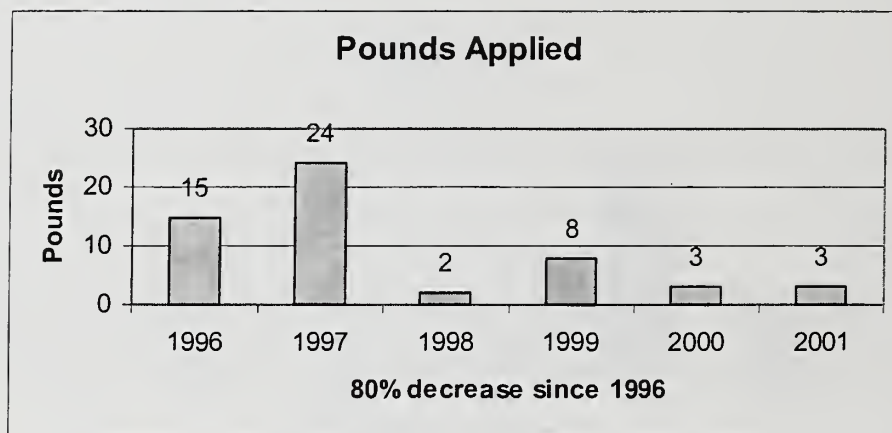
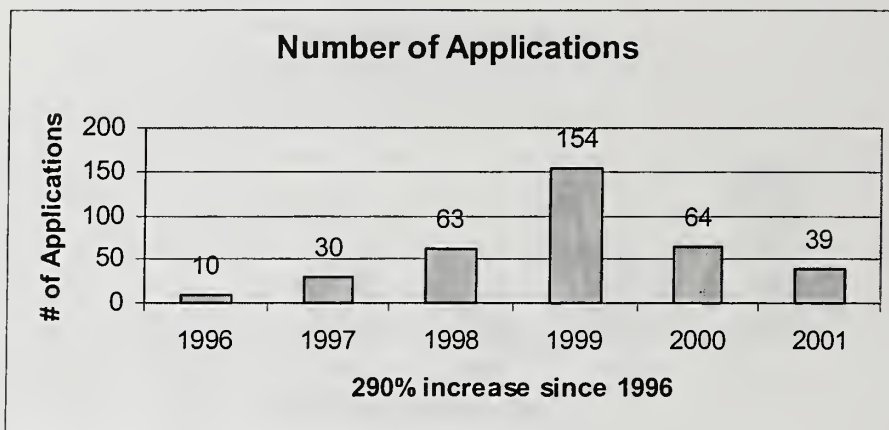
*Danger refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

Department of Transportation “Warning”* Products Used



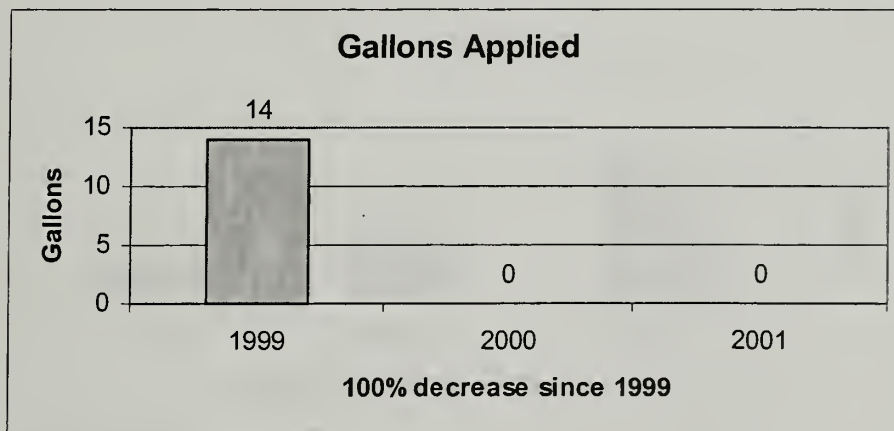
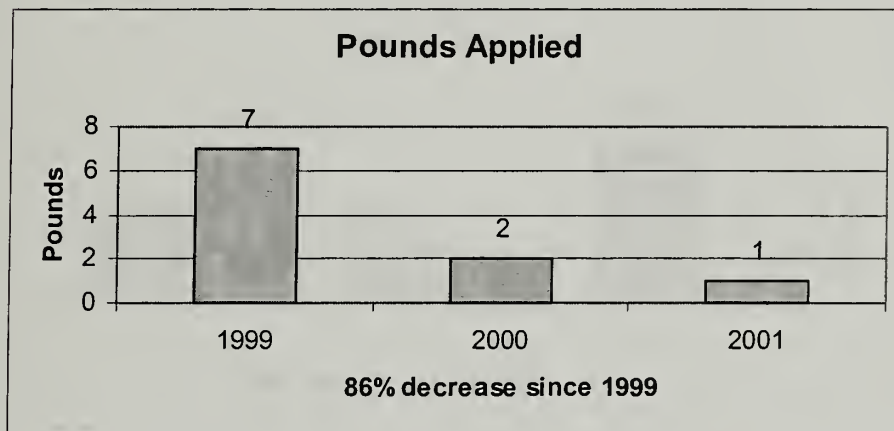
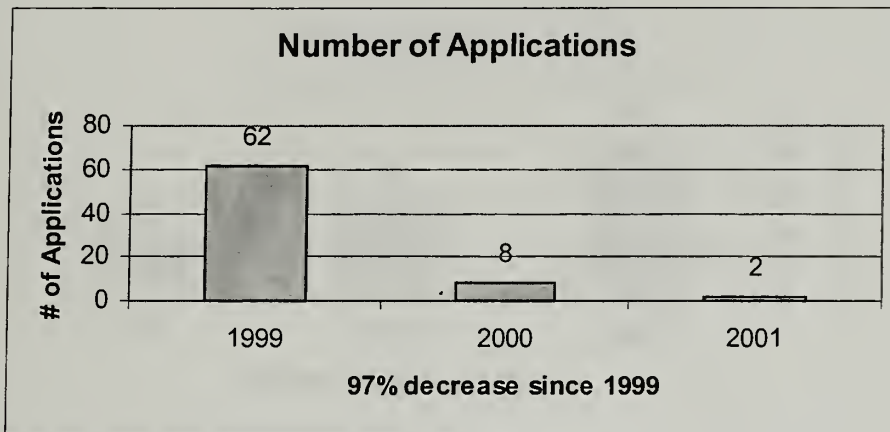
* Warning refers to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

Department of Transportation "Caution"* Products Used



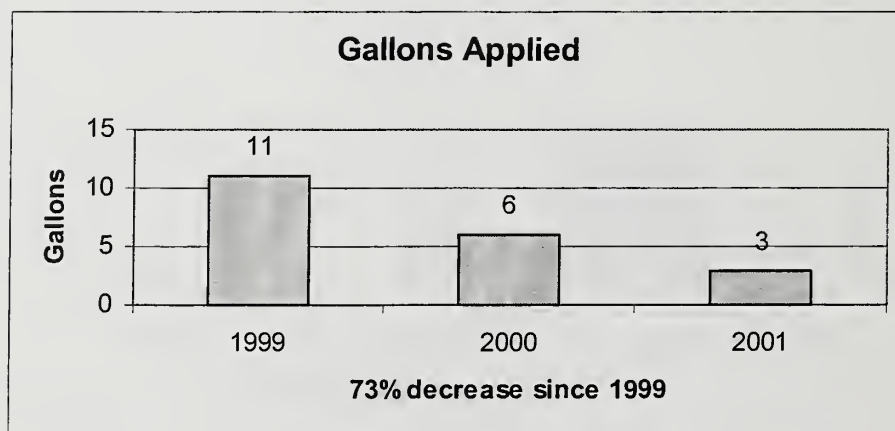
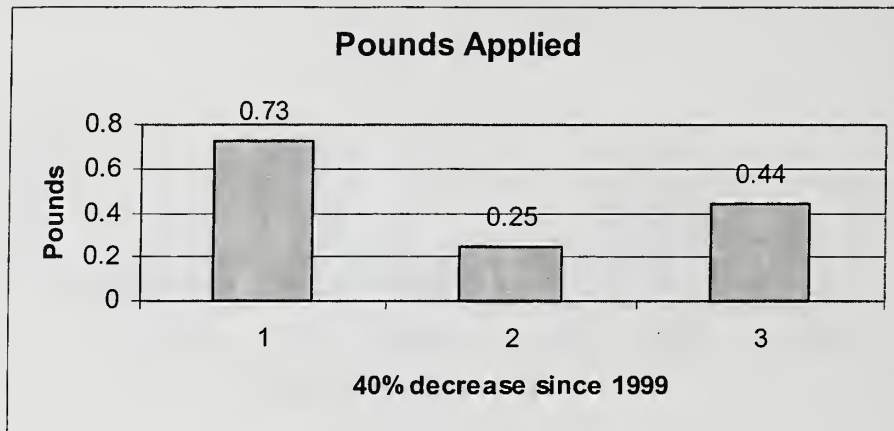
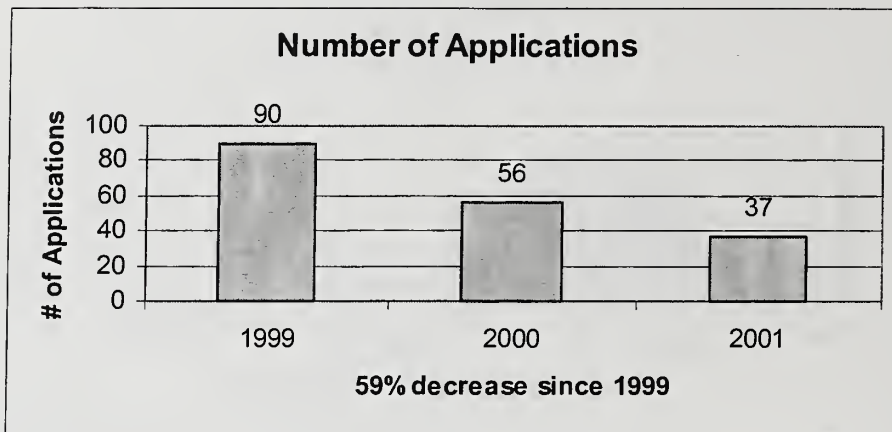
*Caution refers to the signal word placed on the pesticide label. The signal word refers to a measure of acute toxicity as defined by the Environmental Protection Agency.

Department of Transportation Use of *Tier 1** Pesticide Products



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Department of Transportation Use of "Tier 2"* Pesticide Products



*Tier 2 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

**Department of Transportation
Use of “Tier 3”* Pesticide Products**

No Reported Use of Tier 3 Products

* Tier 3 refers to evaluation criteria developed by Mr. Philip Dickey and the Department of the Environment (www.sfenvironment.com) that considers human health and environmental impacts.

Future Directions

City Departments have made remarkable progress since the implementation of the IPM Ordinance. This next year will challenge all of us to achieve further reductions in total pesticide use. DOE will work with City Department's IPM Coordinators to update and revise their IPM Program Plans. DOE will assist City Departments in identifying practices or procedures that could reduce the use of pesticides. DOE will select and sponsor IPM Demonstration Projects that provide an alternative to using chemicals.

The trends in the data show that the City may be reaching a leveling off in the total amount of RoundUp used on City property. City Departments may need additional resources to achieve further reductions. This next year the DOE will work closely with the City IPM Coordinators to investigate possible options and resources.

We anticipate that the coming year will have several data spikes in chemical use because of single pesticide use events scheduled to improve Recreation and Park facilities, at the Conservatory and Harding Park Golf Course. Also, unpredictable El Nino, increased rainfall, and associated pest problems (such as standing water breeding mosquitoes) may require one-time chemical treatments.

Other possibilities for the future include:

Newsletter: The members of the IPM TAC have requested that the DOE create a Citywide newsletter that publicizes the IPM Program to City employees. Newsletters would reach additional staff members not able to take advantage of the DOE TAC meetings, trainings, and conferences.

Advisory Committee: The DOE staff, will explore the creation of a more formalized public input process, perhaps and advisory committee. The number of inquiries to the DOE indicates a high level of public interest.

Public Notification: DOE will continue to work with site managers to improve documentation of all pest control measures use within their buildings. With the start of a new pest control contract, emphasis will be given on pest control notebooks being placed in each city building. These notebooks would contain pest logs, records of pest control measures, labels and material safety data sheets for each pesticide used within a building.



DEPARTMENT OF THE ENVIRONMENT
CITY AND COUNTY OF SAN FRANCISCO
 FRANCESCA VIETOR, DIRECTOR

Integrated Pest Management Program
Reduced Risk Pesticide List

April, 2001

Preamble

The following list represents the pesticide products approved for use under San Francisco's Integrated Pest Management Ordinance (Adopted 10/96, Section 39.8(f), San Francisco Municipal Code). The list will be updated on an as-needed basis to reflect the availability of new reduced risk products and the removal of products with the greatest human health and environmental concern. Products are designated as Allowed (A), Limited Use (L), and Limited Use of Special Concern (L*). Each limited use product is accompanied by the specific circumstances under which it is approved for use. In all cases, restrictions on use as determined by the label are to be followed as required by law.

Integrated Pest Management (IPM) Programs involve a number of elements to control pests while ensuring a safe working and play environment. Chemical pesticides represent only a single control strategy and are used only as a last resort. Thus all chemicals included in the Adopted List are assumed to be used only after programs are in place to improve sanitation, prevent pest infestation, and implement non-chemical management measures. If such a pest management program proves insufficient to control a pest then the chemicals listed below may be utilized as tools according to the restrictions specified for each pesticide product.

San Francisco's IPM ordinance allows for chemicals to be used that are not on the Adopted List through an exemption process. The Department of the Environment reviews all exemption requests and exemptions will only be granted in cases of well-documented need for the pesticide and when all other alternatives have been tried or deemed impractical. In addition, requesting departments must develop a pest management plan for preventing further use of the pesticide.

One important goal of an IPM program is to reduce the unnecessary use of chemical pesticides. In relation to this goal, the term, *targeted application*, refers to pesticides applied only to the pest and not to adjacent non-targets. Several products on the Adopted List, specifically pre-emergent herbicides, fungicides, and some post-emergent herbicides are used in broadcast applications where the product is spread over an entire area and not just onto the targeted pests. Although these products currently meet the reduced risk criteria, their use is of special concern in an IPM program. It is the goal of the IPM program to phase out the use of these products and departments who use them will be expected to track their use closely, develop alternative control strategies and justify the continuing need for these products at the end of the year.

Site-Specific Rodenticide Plan For Control of Rats and Mice. 12/8/99

Due to the concern over primary and secondary poisoning the type of rodenticide and the manner in which it is applied will be determined by the general site characteristics.

Landscaped area: area under cultivation

Natural area: within urban setting or wilderness, significant wildlife concern

Primary poisoning: non-target animal eats poison directly

Secondary poisoning: non-target animal eats poisoned target animal as prey

General Site Description

Rodenticide Use

Interior of structures with occupants (i.e. office space, recreation sites)	Trapping only.
Interior of non-enclosed structures (i.e. storage, stables, airport service areas)	Secure and anchored bait stations can be placed inside on a preventative basis. Single feeding OK especially when other sources of food are present and when have public health concerns (ex. Haunta)
Exterior of structures in urbanized areas (i.e. perimeter of offices)	Secure and anchored bait stations around perimeter, single feeding OK but use Brodifacoum as last resort. No broadcast baits or pellets. Use mouse sized pellets only, must be placed far into burrows.
Exterior of structures in natural areas	Multiple feeding baits secured within bait boxes or buried in burrows. No pellets. Single feeding bait used only as last resort in case of human health concern or structural integrity.
Inside of sewers or sewage treatment facilities	Baits must be secured either inside the sewer or inside a bait box. Any single feeding OK.
Landscape not adjacent to a natural area	Bait placed deep inside burrows, minimize use of pellets, mouse sized pellets only, must be buried deep in the burrow. Use Brodifacoum as last resort.
Natural area or landscape adjacent to a natural area	Baiting should be limited to sensitive sites (ex. campfire area) otherwise emphasis is on preventing infestation of structures. Multiple feeding baits that are secured inside bait boxes or burrows. No use of pellets or single feeding rodenticides.

Pesticide Type A=aquatic F=fungicide I= insecticide H=herbicide S=slug V=vertebrate	Use Category A = allowed L = limited L* = special concern	Hazard Tier (defined by Dr. Philip Dickey, WA Toxics Coalition *)	Product Name	Active Ingredients	EPA Reg #	Use Limitations
I	L	*	20 Mule Team Tim-Bor	disodium octaborate	1624-39-AA-1624	For control and prevention of termites, beetles, and carpenter ants upon recommendation of Branch III pest control operator.
F	L*	*	3336 WP	phenylenebis-thioallophanate	1001-63-AA-1001	Greens, nursery. Try kaligreen with larger mesh in spray rig for nursery use.
I	A	***	Advance Dual Choice Ant Bait	sulfuramid	499-459-AA-499	
I	L	**	Agnique MMF	isooctadecyl-hydroxyl	2302-14	Standing water, human health concerns.
I	L	*	Allosid Briquets (4.5 g/cake)	methoprene	2724-375-ZA-64833	PUC for contained sewage treatment facilities
F	L	/	AQ 10 Biofungicide	Ampelomyces	55638-16-AA-55638	Nurseries, roses, dahlias for powdery mildew.
A	A	***	Aquashade	acid yellow-23, acid blue 4	33068-1-AA-33068	More information is needed an active ingredient.
I	A	**	Avert 300 Cockroach Pressurized Spray	abamectin	499-322-AA-499	
I	A	**	Avert Cockroach Bait Station	abamectin	499-467-AA-499	
I	A	**	Avert Cockroach Gel	abamectin	499-410-AA-499	
I	L	**	Avid 0.15 EC	avermectin	618-96-AA-618	Nursery use only.
I	L	**	Azatin XL	Azadirachtin	70051-27-59807	Nurseries and established plants for interiorscapes.
H	A	***	Bio-Weed	corn gluten meal	1051098-3001-AA	
F	L*	*	Black Leaf Rootone F Brand Rooting Hormone	Thiram	264-499-AA-5887	Nursery use only. Problem with mixing and storage due to talc.
I	L	**	Borid	boric acid	9444-129-ZA-9444	limit human exposure to dust
I	L	***	BotaniGard ES	Beauveria bassiana strain	65626-8-ZA-65626	Control of thrips on landscaped plants. Biological product but some concern over bee toxicity.
I	A	***	Cinnamite	Cinnamaldenhyde	58866-12-ZA-65626	
adjuvant	A	***	CMR Silicone Surfactant	polymethylsiloxane, nonionic.	1050775-50025-AA	
F	L	/	Companion	Bacillus species	71065-EUP-1	golf course turf, need more info on active ingred.
V	L	*	Contrac All-Weather Blox	bromadiolone	12455-79-AA-12455	High concern over 2nd poisoning, see site specific limits
S	L*	*	Deadline-40	metaldehyde	64864-1-ZA-64864	Rec/Park use up small amount in stock. Use in containers. Remove from list in 2002
S	A	***	Dipel 2X worm killer, WP	Bacillus Thuringiensis	275-37-AA-275	
hormone	A	***	Dip'n Grow	indole-3-butyric acid	64388-1-AA-64388	
V	L	**	Ditrac supersize blox	diphacinone	12455-14-ZA-12455	Concern over 2nd poisoning, see site specific limits.
I	L	**	Dr. Moss Liquid bait	orthoboric acid 1%	56-72	precautions over exposure to boric acid
I	L	**	Drax Ant Kill Gel	orthoboric acid 5%	9444-131-AA-9444	precautions over exposure to boric acid
I	A	**	Drax Ant Kill-PF	orthoboric acid 5%	9444-135-AA-9444	precautions over exposure to boric acid
I	L	**	Drax Liquidator	orthoboric acid 1%	9444-206-AA-9444	precautions over exposure to boric acid

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S	L*	*	Durham Metaldehyde Granules 3.5	metaldehyde	5481-91-AA-5481	One year limit. Nursery use only if damage to stock is evident. Hand-pick larger slugs.
V	A	/	Eaton's 4 the Birds	polybutene 80%	8254-1-ZA-56	
V	L	**	Eatons all-weather bait block	diphacinone	56-41-AA-56	Concern over 2nd poisoning, see site specific limits.
V	L	**	Eaton's Answer for the Control of Pocket Gophers	diphacinone	56-57-AA-56	Damage to: dams, levees, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.
I	L*	*	Endeavor	Pymetrozine	100-913	Nursery use only for control of white fly
I	L	***	Enstar II Insect Growth Regulator	kinoprene	55947-82-ZA-55947	Nurseries, roses
H	L	**	Ezject Selective Injection Herbicide	glyphosate	524-435-AA-524	Tree stump injection, prefer mechanical methods
V	L	*	Final Blox	brodifacoum	12455-89	Extreme concern over 2nd poisoning, see site specific limits
I	A	***	FluorGuard Ant Control Bait	sulfonamide	1812-348-AA-279	
H	L	**	Garlon 4	triclopyr	62719-40-ZB-62719	Targeted treatment of evasive exotics in parks, natural areas, right of ways. OK for fire suppression, pilot alternative strategies.
V	L	/	Generation Blocks	diethialone		Unknown effects on 2nd poisoning, single feed,
V	L	/	Generation Mini-blocks	diethialone		Unknown effects on 2nd poisoning, single feed,
V	L	/	Generation Pellets	diethialone		Unknown effects on primary and 2nd poisoning, single feed,
V	L	**	Gopher Getter type 2 Bait by Wilco	chlorophacinone	36029-50003-AA-36029	Damage to: dams, levees, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.
V	L	**	Ground Squirrel Bait by Wilco	chlorophacinone	36029-50004-AA-36029	Damage to: dams, levees, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.
F	L*	*	Heritage Fungicide	azoxystrobin	10182-408-AA-10182	Damage to: dams, levees, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.
I	A	***	Hot Pepper Wax Insect Repellent	capsaicin .00014%	67238-1-AA-67238	Greens, highest profile athletic fields. Improve aeration and monitoring programs.
F/I	A	**	JMS Stylet Oil	petroleum distillates	65564-1-AA-65564	
F	A	***	Kaligreen	potassium bicarbonate	70231-1-AA-70231	
V	L	*	Maki Paraffin Blocks	bromadiolone	7173-189-AA-7173	High concern over 2nd poisoning, see site specific limits

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I	L*	*	Marathon 1% Granular Greenhouse and Nursery	imidacloprid	3125-452-AA-59807	One year limit. Nursery use for control of white fly, not for use in propagation beds. Try Endeavor.
I	L	**	Maxforce Ant Bait F1	fipronil	64248-10-AA-64248	Minimize use through prevention, possible concern over active ingredient
I	L	**	Maxforce IBE4 Carpenter Ant Bait	fipronil	64248-21	Minimize use through prevention, possible concern over active ingredient
I	L*	*	Maxforce Professional Insect Control Ant	hydromethylnon	64248-6-AA-64248	Pharoah and Argentine ants. Outdoor use in containers. Must be part of comprehensive baiting program.
I	L	**	Maxforce Roach Bait F.05	fipronil	64248-11-AA-64248	Minimize use through prevention, possible concern over active ingredient
I	L	**	Maxforce Roach Killer Bait Gel	fipronil	64248-14	Minimize use through prevention, possible concern over active ingredient
I	A	***	Mosquito Dunks	Bacillus Thuringiensis	6218-47-ZB-6218	
I	L	**	M-pede Insecticide	potassium salts /fatty acids	53219-6-AA-53219	Nursery and specialty gardens only.
I	L	**	Neemazad 0.25 EC	Azadirachtin	70051-5-ZA-70051	Nursery use only. Avoid contact with bees.
S	A	***	Neu 1165M Slug and Snail Bait	iron phosphate	67702-3-AA-67702	
H	L	**	Oust Weed Killer by DuPont	sulfometuron-methyl	352-401-AA-352	Rights of ways
H	L*	**	Pendulum WDG Herbicide	pendimethalin	241-340-AA-241	One year limit. OK for highest priority plantings, dam faces, fire prevention, areas too dangerous for handweeding, and for specific exotic/invasive "A Rated" weeds. Renovations require exemption.
I	A	***	Pharoid	methoprene	2724-420-ZA-2724	
I	L	/	Precor 1% Emulsifiable Concentrate	methoprene	2724-352-AA-50809	Minimize use through vacuuming and host exclusion
H	L*	*	Proturf New K-O-G Weed Control	dicamba	538-112-AA-538	One year limit. Spot treatment of greens, highest priority turf, when hand-picking is not feasible.
F	L	*	Proturf System Systemic Fung.	thiophanate-methyl	538-88-ZA-538	Greens, highest profile athletic fields
I	L	**	PT 515 WaspFreeze Wasp and Hornet	phenothrin, allethrin, CO2	499-362-AA-499	Use only when a concern for public safety. Spot spray for knockdown in high priority areas. Must have comprehensive baiting or prevention program in place.
I	L*	*	PT Brand 175 Microcare	piperon. butoxide, pyrethrins	499-381-AA-499	
I	L	**	Roach-X	boric acid 35%	71761-1-AA	Precautions over exposure to boric acid, especially at such a relatively high concentration

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A	L	**	Rodeo Aquatic Herbicide	glyphosate	524-343-AA-524	Emergent plants in ponds, lakes, drainage canals. Only as a last resort when other mgmt. practices are ineffective.
F	A	/	Root Shield Drench	Trichoderma harzianum	68539-4-ZB-68539	
H	L	**	Roundup Pro Herbicide	glyphosate	524-475-ZA-524	Spot treatment of areas inaccessible or too dangerous for hand methods, right of ways, utility access, fire prevention. Use for cracks in hardscape and edging only as last resort. OK for renovation but must put in place weed prevention measures.
H	L	**	Roundup Pro Dry Pack	glyphosate	524-505	same limitations as Roundup Pro
I	L	**	Saf-T-Side	paraffinic oil	48813-1-AA-48813	Trace of alkyl-phenol ethoxylates, avoid contact with surface waters.
A	L	**	Sonar A.S.	fluridone	67690-4-AA-67690	Emergent plants in ponds, lakes, drainage canals. Only as a last resort when other mgmt. practices are ineffective.
adjuvant	A	***	Spraytech Oil	soybean oil	65328-50001-AA-65328	
I	L*	*	Sun Spray Ultra-fine Spray Oil	paraffinic oil	862-23-AA-53219	One year limit. Nursery and roses control of scale. Try Saf-T-Side and Spraytech oil as replacement.
H	A	***	Supressa	corn gluten meal	1051074-30001-AA	
V	L	*	Talon-G Rodenticide Mini-Pellets	brodifacoum	10182-341-AA-10182	Extreme concern over primary and 2nd poisoning. see site specific limits.
I	L*	*	Tempo 20 WP	cyfluthrin	3125-380-AA-3125	Knockdown in high priority areas. Must have comprehensive baiting or prevention program in place.
I	L	**	Terro California Ant Killer Bait	sodium tetraborate	149-8-AA-149	
F/I	A	**	Triact 90EC	neem oil	70051-8-AA-70051	limit human exposure to dust
I	L	**	Trifluralin (Niban granular bait)	orthoboric acid	64405-2-AA-64405	Outdoor restricted to planted areas, prefer containers; indoor must be in containers or inaccessible to humans
H	L	**	Turfion Ester (post)	triclopyr	62719-258-AA-62719	targeted treatment of turf; broadcast application requires exemption
F/I	A	**	Valent Volck Supreme Spray	petroleum oil	59639-20-AA-59639	
H	L*	*	Vanquish Herbicide	dicamba(dichloro anisic acid)	55947-46-AA-55947	One year limit. Spot treatment only of greens, fairways and highest profile athletic fields. Emphasize hand removal and fertilization.
I	A	***	Vectobac-G Biological Mosquito Larvicide	Bacillus Thuringiensis	275-50-AA-275	
V	L	**	Vectolex G Biological Mosquito Larvicide	bacillus sphaericus	275-77AA-275	
V	L	/	Vengeance Rodenticide	bromethalin	432-748-AA-432	High concern over 2nd poisoning
V	L	*	Weatherblok Bait with Bitrex	brodifacoum	10182-339-AA-10182	Extreme concern over 2nd poisoning, see site specific limits

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Pesticides Added to 2001 Approved List

Pesticide Type	Use Category	Hazard Tier (defined by Dr. Philip Dickey, WA Toxics Coalition ^)	Product Name	Active Ingredients	EPA Reg #
I	A	***	Pharorid	methoprene	2724-420-ZA-2724

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Pesticides Removed From 2000 Approved List

April 2001

Pesticide Type A=aquatic F=fungicide I= insecticide H=herbicide S=slug V=vertebrate	Use Category A = allowed L= limited L* = special concern	Hazard Tier (defined by Dr. Philip Dickey, WA Toxics Coalition ^)	Product Name	Active Ingredients	EPA Reg #	Comments
F	L*	*	3336 GC	thiophanate-methyl	1001-63	
F	L*	*	Champ Formula	copper hydroxide	55146-64	Planned phase-out
I	L	**	Gentrol-cockroach	hydroprene	2724-304-50809	
I	L	**	WaspFreeze	phenothrin, allethrin, CO2	499-362-AA-499	
I	A	***	Eco PCO AC contact insect.	hexa-hydroxyl, eugenol	67425-4	Not approved for use in CA
I	A	***	Eco PCO D dust insect.	hexa-hydroxyl, eugenol	67425-2	Not approved for use in CA
I	A	***	Eco PCO Jet contact insect.	hexa-hydroxyl, eugenol	67425-5	Not approved for use in CA
H	L*	/	Manage (pre/post emergent)	carbonylaminosulfonyl	524-465-AA	Planned phase-out

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DEPARTMENT OF THE ENVIRONMENT
CITY AND COUNTY OF SAN FRANCISCO
 FRANCESCA VIETOR, DIRECTOR

IPM Technical Advisory Committee

July 12, 2001

Simon Theater

Laguna Honda Hospital

9:30 AM – 11:30 AM

1. TAC Member Updates

- a. New Member Introductions (Janine, Peter)
- b. Heat Treatment Demo (Robin)
- c. Pressure Treated Wood
- d. New Additions to Approved List
- e. Biddy Biddy Update (Lou)
- f. Vikane fumigant article
- g. Other

2. Pigeons – *wild animals or rats on wings?*

a. Concerns of Government Agencies

- i. Lt. Peter Schembri – Fire Department
- ii. Sgt. Judy Choy – Animal Care and Control
- iii. Helen Zverina – Dept. of Public Health, Environmental Health
- iv. Dennis Patzer – Structural Pest Control Board

b. Bird Behavior, Biology, and Control

- i. Judith Champagne – Waterworks and E-Bird
- ii. Art Slater – consultant and bird expert

c. Field Trip and Trouble Shooting Exercise

**Next meeting:
 Thursday, August 9th
 Rec/Park Nursery in Golden Gate Park
 Presentation on EcoPCO and Exempt
 Pesticide Products**



DEPARTMENT OF THE ENVIRONMENT

CITY AND COUNTY OF SAN FRANCISCO

FRANCESCA VIETOR, DIRECTOR

IPM Technical Advisory Committee

August 9, 2001

Golden Gate Park Nursery

9:30 AM – 11:30 AM

1. TAC Member Updates

- a. Asian Tiger Mosquitoes and Bed Bugs
- b. Brochure (Sheila)
- c. IPM Conference – January 29, 2002
- d. IPM Outreach at SFIA (Stu)
- e. Flamer Update (Janine)
- f. Structural update
- g. Other

2. EcoSmart Technologies - Patrick Cummiskey, General Manager Professional Division

A discussion of the exemption process in pesticide registration and the reduced risk products developed by EcoSmart technologies.

3. Eco Weeder - Louie Murgg

An update and discussion on use of the infra-red weeders. Followed by a product demonstration for those who missed the Presidio demonstration.

**Next meeting:
Thursday, September 13th
At SF General Hospital
Termite fumigations and the Asian Tiger
Mosquito**



DEPARTMENT OF THE ENVIRONMENT
CITY AND COUNTY OF SAN FRANCISCO
FRANCESCA VIETOR, DIRECTOR

From: Debbie Raphael
Pesticide Program Coordinator
11 Grove Street
San Francisco, CA 94102
Phone: (415) 554-6399
FAX: (415) 554-6393
debbie_raphael@ci.sf.ca.us

Date: 9/10/01

Number of Pages: 2

To: _____

FAX: (415) _____

IPM Technical Advisory Committee
September 13, 2001

SF General Hospital, Bldg 30, rm 3208

9:30 AM – 11:30 AM

1. TAC Member Updates

- a. Introduction of new Director of the Department of the Environment, Jared Blumenfeld
- b. DPR Award
- c. US Forest Service: Risk Assessment for Herbicides and Non-Chemical Vegetation Management (Bruce Badzik)
- d. IPM Conference - agenda
- e. Structural Update
- f. Other

2. Fumigating for Termites: Safety and Efficacy

Sharon Seslowe, Alameda County Ag. Commissioners Office

3. Mosquitoes: Old inhabitants and new comers (West Nile Virus, Asian Tiger Mosquito)

Alexandra S. Porshnikoff, San Mateo County Mosquito Abatement District

DIRECTIONS FOLLOW ON NEXT PAGE

1540 MARKET STREET, SUITE 160, SAN FRANCISCO, CALIFORNIA 94102

WWW.CI.SF.CA.US/ENVIRONMENT

TELEPHONE (415) 554-6390 FAX 554-6393 E-MAIL: ENVIRONMENT@CI.SF.CA.US

Visit to Clorox Technical Center by Bay Area IPM Specialists Thursday, October 4th, 2001

9:00-9:30AM - Assembly and coffee – Clorox Technical Center lobby

9:30-9:40 - Greetings and overview of day's agenda (Ted Shapas, Reza Rahaman). Group splits in half for tours.

9:40-10:50 – Tours

- Insecticides - MaxForce & Combat products, ICU (Nonggang Bao, Jim Read)
- Microbiology – Disinfectant and antimicrobial products (Robin Dias, Denis Haire)

10:50-12:10 - Regulatory Compliance & Product Safety discussions, Conference Room I (Surekha Akella, Steve Smith, Krishna Reddy, Jim McCabe, Janice Saiki)

- GLP
- Exempt Pesticides (25b list)
- Disclosure of inerts - what are the issues, do we have a position?
- Prop 65
- Registration of pesticides in CA vs US
(what is the process, and how do safety issues and efficacy requirements fit in?)

12:10-1:00PM - informal lunch, continue discussions, Building 2 Atrium

1:00-1:30PM – depart CTC

Clorox participants:

Surekha Akella
Nonggang Bao
Robin Dias
Robin Gentz
Denis Haire
Jim McCabe
Reza Rahaman
Jim Read
Krishna Reddy
Janice Saiki
Ted Shapas
Steve Smith



DEPARTMENT OF THE ENVIRONMENT
CITY AND COUNTY OF SAN FRANCISCO
JARED BLUMENFELD, DIRECTOR

IPM Technical Advisory Committee
November 8, 2001

Dept. of the Environment, 11 Grove St.
9:30 AM – 11:30 AM

1. TAC Member Updates

- a. Clorox Fieldtrip – inerts followup
- b. IPM Conference
- c. Structural Update
- d. Pollution Prevention Conference - report back
- e. Training Opportunities
- f. Other

2. Pesticide Use Data – how are we doing?
Janine Goldberg

3. Pesticide related resolutions and legislation
Wood Utility Poles
Arsenic Treated Lumber

4. Restructuring of the Department of the Environment and the Future of the IPM Program

Next meeting:
December 6, 2001
Ideas for a location?
Mel Sied will be a guest speaker on pest
control in Asia



DEPARTMENT OF THE ENVIRONMENT

CITY AND COUNTY OF SAN FRANCISCO

JARED BLUMENFELD, DIRECTOR

IPM Technical Advisory Committee

December 6, 2001

MUNI, 700 Pennsylvania Room D106

9:30 AM – 11:30 AM

1. TAC Member Updates

- a. Annual Report
- b. Structural Update
- c. Other

2. IPM Conference – Tuesday January 29th

City talks
Environmental Service Awards
Publicity
Volunteer needs

3. Role of the Department of the Environment in IPM

TAC meetings
Training/Conferences
Reports
Data Collection
Product Evaluation
Ordinance oversight
Pilot projects
Commission/Board of Supervisors
Community Outreach

Next meeting:
January 10, 2001
Water Department
Mel Seid will be the featured speaker

11 Grove Street, SAN FRANCISCO, CALIFORNIA 94102

WWW.SFENVIRONMENT.COM

TELEPHONE (415) 554-6390 FAX 554-6393 E-MAIL: ENVIRONMENT@CI.SF.CA.US



DEPARTMENT OF THE ENVIRONMENT
CITY AND COUNTY OF SAN FRANCISCO

JARED BLUMENFELD, DIRECTOR

Technical Advisory Committee Agenda
Wednesday February 6, 2002
9:30 AM – 11:30 AM
Lake Merced Pump Station

1. Member Updates
 - a. David Graves
 - b. Green Flamers – Janine
 - c. Compost Tea - Phil
 - d. Wood Utility Poles – pentachlorophenol
 - e. Pressure Treated Wood – copper chromium arsenate
 - f. Structural pest control - Luis
 - g. Rodent Summit, February 27 Presidio Officers Club - Bruce
 - h. IPM Coordinators Workshop, March 4,5 at UC Davis
 - i. Other
2. Annual IPM Conference – debriefing
3. Pest Control in Asia – Mel Seid, Dept. of Public Health
4. Flower and Garden Show: March 20-24

Next Meeting:
Thursday March 14th
Location To Be Announced

11 Grove STREET, SAN FRANCISCO, CALIFORNIA 94102

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DEPARTMENT OF THE ENVIRONMENT

CITY AND COUNTY OF SAN FRANCISCO

JARED BLUMENFELD, DIRECTOR

IPM Technical Advisory Committee

March 14, 2002

Lake Merced Pump Station

9:30 AM – 11:30 AM

1. TAC Member Updates

- a. UTECH barrier cloth, Sunol - Robin
- b. UC IPM Meeting
- c. Structural Update
- d. Other

2. Honey Bees – Biology and strategies for control/relocation.

Special example: Pilarcitos cottage.

Mark Moss, Bee Keeper

3. San Francisco Flower and Garden Show - logistics

Next meeting:

April 11, 2002

County Ag. Office (?)



DEPARTMENT OF THE ENVIRONMENT
CITY AND COUNTY OF SAN FRANCISCO
JARED BLUMENFELD, DIRECTOR

Technical Advisory Committee Agenda
Thursday April 11, 2002
9:30 AM – 11:30 AM
Dept. Consumer Assurance

1. Member Updates
 - a. Safety Training schedule
 - b. Green Flamers training
 - c. Flower and Garden Show review
 - d. Job opening (\$15/hr)
 - e. Structural pest control - Luis
 - f. Other
2. Problem Weeds of San Francisco and Beyond
What does it mean to be an "A" rated weed?
– Robin Breckenridge California Dept. of Food and Agriculture
3. Pigeon Abatement at Laguna Honda Hospital – Arturo De Leong

Next Meeting:
Thursday May 9th
Location To Be Announced



DEPARTMENT OF THE ENVIRONMENT
CITY AND COUNTY OF SAN FRANCISCO
JARED BLUMENFELD, DIRECTOR

Technical Advisory Committee Agenda
Thursday June 6, 2002
9:30 AM – 11:30 AM
Presidio Golf Clubhouse – Palmer Room

1. Member Updates
 - a. Safety and Green Flamer Training
 - b. Harding Park – Phil
 - c. Weed Management Area - Lou
 - d. Pest Control Contract
 - e. IPM at the State's Capitol
 - f. Pressure Treated Wood resolution
 - g. Staffing changes
 - h. Structural pest control - Luis
 - i. Other

2. IPM at the Presidio – Then and Now
 - i. Bruce Badzik - History and rodents
 - ii. Christa Conforti – Daisys, tea, and other trials
 - iii. Josh Heersink – The future of golf

Next Meeting:
Thursday July 11th
Location To Be Announced
BBQ???



DEPARTMENT OF THE ENVIRONMENT
CITY AND COUNTY OF SAN FRANCISCO
JARED BLUMENFELD, DIRECTOR

IPM Technical Advisory Committee
July 11, 2002

County Fair Building, Golden Gate Park
9th and Lincoln

9:30 AM – 11:30 AM

1. TAC Member Updates

- a. Harding Park - Phil
- b. Noxious Weeds – Robin, Bill
- c. Termites in the Leper Colony – Bruce
- d. City of Fremont contract spec – Mark
- e. Acid weed killers – Steve
- f. Posting question
- g. Annual Conference – Tuesday, January 28, 2003
- h. Departmental sites for pest control contract
- i. Approved List revisions
- j. Structural Update
- k. Other

2. Racoon Roundworm – the latest pubic health threat.

Laurie Frazer, Santa Clara County Vector Control (408) 792-5010

Next meeting:

August 8, 2002

Pigeons Revisited

Location to be announced

11 Grove Street, SAN FRANCISCO, CALIFORNIA 94102

WWW.SFENVIRONMENT.COM

TELEPHONE (415) 554-6390 FAX 554-6393 E-MAIL: ENVIRONMENT@CI.SF.CA.US



Tuesday

January 29, 2002

8:30 am to 4:00 pm

Haram Johnson

State Building

455 Golden Gate St.

San Francisco, CA.



The Noxious Weed Biddy-biddy, *Acacia novae-zelandiae*, found at Laguna Honda Hospital and MUNI's Forest Hills Station.

San Francisco IPM Conference

6th Annual San Francisco IPM Conference Program:

- 8:30** Registration and refreshments
- 9:00** Introduction and Welcoming Remarks
Jared Blumenfeld, Director, Department of the Environment
- 9:05** Environmental Service Awards.
Honorable Willie Brown, Mayor of San Francisco
- 9:30** Inerts: Right to know or left to wonder?
Caroline Cox, Northwest Coalition for Alternatives to Pesticides (NCAP)
- 10:15** Evaluating Pesticides: Simple steps for a complex task.
Philip Dickey, Washington Toxics Coalition
- 10:55** BREAK
- 11:15** Healthy Schools Act: The Los Angeles Unified Experience.
Robert Hamm, Los Angeles Unified School District
- 11:45** Weeds as Indicators: What do your weeds tell you, learn the language.
Cheryl Wilen, University of California Cooperative Extension
- 12:15 - 1:15 PM**; Lunch (available for a fee, see registration information)
Breakout rooms labeled for networking groups, choose any or many.
- 1:15** City and County Experiences in IPM
SF 4 Years of Reduced Use - Debbie Raphael, Pesticide Reduction Coordinator
SF Department of the Environment
- Beneficials at the Conservatory - Ralph Montana, PCA, Rec. & Parks**
SFPUC Gives Goats the Brush - Robin Breuer, IPM Coordinator, PUC
IPM Outreach to Airport Tenants - Stu Dake, IPM Coordinator,
SF International Airport
- 2:00** IPM: the Inside Story (IPM for Interiorscapes)
Bob Fiorello, PCA, Rec. & Parks Department
- 2:30** BREAK
- 2:45** Sudden Oak Death: What's the future of our woodlands?
Pavel Svihra, Horticultural Advisor, UC Cooperative Extension, Marin County
- 3:15** Speaker Panel: What more do you want to know?
- 3:45** Evaluations and Drawing for Prizes (you must be present to win!)
- 4:00** ADJOURN



Ladybird beetle eating an aphid.

SAN FRANCISCO CITY AND COUNTY SPONSORS:

- Department of the Environment
- Department of Recreation & Parks
- Department of Public Works
- Public Utilities Commission
- Department of Public Transportation
- Department of Public Health
- San Francisco Airport Commission
- San Francisco Port Authority
- Department of Consumer Assurance.

Green Flamer Safety Guidelines

FOR THE SAFETY AND HEALTH OF YOURSELF AND OTHERS:

- *DO NOT use lighters, matches, or other flame to detect leaks*
- *DO NOT smoke while handling or transporting propane.*
- *DO NOT warm tank to increase pressure.*
- *DO NOT carry or store propane tanks inside of vehicles.*
- *DO NOT use flamers on "Spare the Air" days.*

IMPROPER USE, TRANSPORTATION, OR STORAGE OF GREEN FLAMING EQUIPMENT CAN BE HAZARDOUS!

In All Situations You Must:

- Secure and lock equipment when not in use or under your direct supervision (within 25 feet); such as during breaks, lunch, or when performing other work activities.
- Cover tanks or keep in shaded area and keep away from heat sources to avoid dangerous pressure increases.

During Transportation You Must:

- Attach safety plug while transporting and when tank is not in use.
- Transport tanks in open spaces, not inside vehicles.
- Keep tanks in upright position.
- Secure tanks before transportation.

During And Immediately Following Operation You Must:

- Inspect equipment for safe operation, fuel line leaks, valve leaks, etc. with a spray bottle of soapsuds solution.
- Use signs, caution tape, or a co-worker to keep people and pets at a safe distance.
- Wear approved safety gear. Long pants, leather gloves, leather boots, and eye protection.
- Have a 2.5 gallon sprayer with water, charged water source with hose, or water truck for fire suppression and drenching of any areas found to be smoldering or smoking following treatment before you leave the work site.
- Have a fully charged and approved A-B-C fire suppressant/extinguisher on-site during operation.
- Flame only green vegetation, avoid incinerating plants, flaming of dry materials, and flammable substances.
- Use flamer only when wind speed is *less than* 15 miles per hour.
- Avoid touching the flame end of the torch, its temperature may exceed 1,000oF.
- Allow a minimum of 15 minutes for the torch to cool after flame-out.
- Keep the equipment under personal supervision (within 25 feet) or lock/store equipment when not in use to prevent accident, theft, or tampering.
- Keep records of sites treated including date, plant type treated, area treated, etc.
- Bleed the gas lines (hose and torch body) by closing the valve on the tank first and allowing the gas in the hose/torch to burn off before shutting off the torch control valve.
- Perform a thorough fire safety inspection before leaving the treated site.

When Storing Equipment You Must:

- Store LP tank outdoors in a locked and fenced (preferably covered) department approved LP gas storage area.
- Avoid heat sources such as: sparks, flame, running engines, exhaust pipes, or direct sunlight.
- Store LP tanks upright in well ventilated areas, avoid low and enclosed areas where gas can collect.
- Store LP tanks in cool shaded areas.
- Allow torch to cool sufficiently before storing, a minimum of 15 minutes is recommended.
- Be sure the hose and torch are clear of gas and de-pressurized before storing.
- Clean and dry torch and equipment on the cart.

Daily Equipment, Safety, and Operations Checklist

EQUIPMENT and START-UP CHECKLIST:

- ☐ Personal Protective Equipment (PPE)
 - ☐ Leather gloves
 - ☐ Leather boots
 - ☐ Long pants
 - ☐ Cotton or wool clothing (avoid synthetics)
 - ☐ Eye protection
- ☐ ABC-Type Fire extinguisher/suppressor
- ☐ Water source (choose one)
 - ☐ 2.5 gallons of water (minimum) in a sprayer
 - ☐ hose and quick coupler or valve key for charge water source
 - ☐ water truck with sufficient hose to reach operation area
- ☐ Soapy water spray bottle for leak detection
- ☐ Torch: visually inspect for wear and damage
- ☐ Gas hose: visually inspect for wear and damage
- ☐ LP Cylinder
 - ☐ Dents
 - ☐ Damage to collar
 - ☐ Damage to valve
 - ☐ Corroded foot ring
 - ☐ Tank secured to cart
- ☐ Chain or cable and padlock to secure equipment during transport and when not in active use
- ☐ Chock-blocks or other braking mechanism to prevent cart from rolling

EQUIPMENT SAFETY CHECKLIST:

- ☐ Connect hose to torch and tank
- ☐ Pressurize the hose by opening the tank valve (be sure torch valve is closed)
- ☐ Using soapy water
 - ☐ Check for gas leaks at the tank valve/hose connection
 - ☐ Check for gas leaks at the hose/torch valve connection
- ☐ Ignite torch and check operation of torch valve
- ☐ If all systems check-out
 - ☐ Turn off tank valve and allow gas in hose/torch to burn off
 - ☐ Allow torch to cool
 - ☐ Load cart onto vehicle and secure it to truck
 - ☐ Cover tank to shade it on warm sunny days
- ☐ Ready to depart for flaming site

ON-SITE PRE-OPERATION CHECKLIST:

- ☐ Set-up water source if not using water sprayer
 - ☐ Find charged water source if available and connect hose
 - ☐ Locate water truck in convenient area
- ☐ Inspect site to be treated for:
 - ☐ Flammable materials
 - ☐ Overly dry areas to avoid
 - ☐ Non-crew persons
 - ☐ Level areas for the cart
- ☐ Plan your path of operation
 - ☐ Use caution tape, flags, signs, or crew-person to mark off the area to be treated
- ☐ Unload equipment and visually check that it is still all there
- ☐ Put on PPE
- ☐ Take cart to starting point
- ☐ Open tank valve and pressurize hose
- ☐ Ignite torch and begin green flaming

DURING OPERATIONS:

- ☐ Continually check for smoking, smoldering, or burning materials

FOLLOWING OPERATIONS:

- ☐ Turn off gas at tank valve and allow the gas to burn off
- ☐ Close torch valve after flame-out
- ☐ While allowing the torch to cool down
- ☐ Check for smoking, smoldering, or burning materials and water down any suspicious areas
- ☐ Load cart onto truck and secure
- ☐ Complete written record of site treatment
- ☐ Check site one last time for smoking, smoldering, or burning materials before leaving

Urban Rodent Summit



The
Golden Gate Club
at The Presidio

Wednesday
February 27, 2002
8:00am to 4:00pm



Summit Program:

- 8:00 AM Registration, Group Assignments, and Morning Refreshments
 8:30 AM Welcome and Introduction from the Summit Sponsors
 8:45 AM San Francisco's Rodent Control Program - Jack Breslin, Director of
 Consumer Protection Programs, S. F. Dept. of Public Health
 9:15 AM The Urban-Rural Interface
 Ron Keith, Marin County Vector Control Program
 10:00 AM Rodent Identification and Biology
 Dr. Desley Whisson, UC Cooperative Extension
 10:50 AM BREAK
 11:10 AM Rodents: Disease and Ectoparasites
 Curtis Fritz, California Department of Health Services
 12 NOON LUNCH

1 to 3:30 PM Breakout Sessions:

Participants will rotate through each of the five stations. Please remain with your group.

Station:

- A. Rodent Proofing (Boiler Room) - Bruce Badzik, National Park Service,
Ron Keith, Marin County Vector Control
- B. Trapping (Breakout Room #1) - Dr. Desley Whisson, UC Cooperative Extension
- C. Bait Selection (Cypress Room) - Greg Howald, Island Conservation Ecology Group
- D. Baiting and Bait Boxes (Cypress Room) - Arthur Slater,
UC Berkeley Pest Management Services (Retired)
- E. Rodent Borne Disease: handling and cleanup procedures (Breakout Room #2) - TBA

3:30 PM Closing Session and Conference Evaluations

4:00 PM Adjourn



Sponsored by:

National Park Service, City and County of San Francisco,
and the University of California

IPM for Public Agencies

**A Conference sponsored by the
University of California Statewide Integrated Pest
Management Project**



March 4 - 5, 2002, UC Davis

Register early! Conference is limited to 150 attendees. Target audience includes:

- Public agency personnel who work in the pest management area--including supervisors, policy makers, and IPM staff: schools, cities, parks and recreation, counties, public works, as well as state agencies.
- UC scientists, especially UCCE advisors who work with urban pest management problems--both structural and landscape.
- Private pest management professionals who contract with public agencies.

AGENDA

Monday, March 4, 2002.

- | | |
|--------|---|
| 1:00pm | Welcome, goals of meeting. Mike Rust, Associate Director of UC Statewide IPM Project and Professor of Entomology, UC Riverside. |
| 1:10pm | What is IPM and What resources does UC have to offer public agency personnel? M.L.Flint, Director, IPM Education & Publications and Extension Entomologist, UC Statewide IPM Project, UC Davis |
| 1:35pm | View from public agencies: What laws and regulations are affecting agency pest management programs and what is the role of an IPM Coordinator? Deborah Raphael, Pest Management Program Coordinator, City and County of San Francisco |
| 2:00pm | Pest Panel: Cockroaches <ul style="list-style-type: none"> • Biology of cockroaches and recent advances in pest management. Don Reiersen, Department of Entomology, UC Riverside |

- Implementing IPM for cockroaches in sensitive facilities at UC Berkeley. Art Slater, Manager, Pest Management Services, UC Berkeley (retired)
- Implementing IPM for cockroaches in Santa Monica. Carl Doucette, Innovative Pest Management, El Segundo
- Discussion

3:00pm Break

3:20pm **Pest Panel: Weeds in the landscape**

- Biology of landscape weeds and recent advances in management. Cheryl Wilen, IPM Advisor, South Coast, UCCE San Diego
- Nonchemical tools for weed management. Clyde Elmore, Weed Science Specialist, UC Davis
- Implementing an IPM program for weeds in Los Angeles. Ann Barklow, Maintenance Director, Manhattan Beach Botanical Garden, Los Angeles
- Implementing an IPM program for weeds. Bob Fiorello, Gardener, Strybing Arboretum
- Discussion

5:00pm - Social and Poster Displays, University Club, UC Davis
7:00pm

Tuesday, March 5, 2002

8:00am Continental breakfast

8:30am **Pest Panel: Ants**

- Ant identification/biology and why it is important. John Klotz, Extension Entomologist, UC Riverside
- Recent advances in ant management. Michael Rust, Entomology, UC Riverside
- The special case of Fire Ants. Les Greenberg, Entomology, UC Riverside.
- Implementing an IPM program for Argentine ants at the NASA Ames Research Facility. Sheila Daar, Daar Consulting Group, Berkeley
- Discussion

10:05am Break

10:25am **Pest Panel: Yellow Jackets**

- Biology and recent advances in managing and baiting yellow jackets and other stinging wasps. Don Reiersen, Entomology, UC Riverside
- Implementing a Yellow Jacket management program on the school ground. Ron Warfield--Marin County Schools
- Implementing a yellow jacket management program in the Sacramento Valley. David Brown, Manager, Sacramento-Yolo Vector Control District
- Discussion

- 11:25am **Eucalyptus lerp psyllids: A case history in exotic pests, management difficulties and classical biological control.** Don Dahlsten, Division of Insect Biology, UC Berkeley
- Questions
- 12:00pm Lunch
- 1:00pm **Panel on Barriers: What are common barriers to implementing IPM in large agencies?**
- personnel problems
 - budget/resources/political or administrative support
 - need for cooperation between multiple units and supervisors
 - public attitudes
 - lack of effective, environmentally sound management methods
 - needs for training or published information
- Discussion
- 2:30pm **Panel: How can Public Agency IPM Coordinators become more proactive in getting their needs met?**
- explore formation of a professional society
 - develop a legislative agenda
 - coordinate with local UCCE resources
 - take advantage of state and federal agency resources
- Discussion
- 3:20pm Wrap-up/Next Steps
- 3:30pm Adjourn

Continuing Education Hours have been requested from the California Department of Pesticide Regulation and Structural Pest Control Board.

The registration fee is \$70 if received by February 12 and \$80 if received between February 12 and February 26. The last day to register for the conference is February 26, 2002.

For general information or to register for the conference, log on to our web site at:

<http://conferences.ucdavis.edu> (click on academic) or
<http://www.cevs.ucdavis.edu/Cofred/Public/Aca/ConfHome.cfm?confid=122>

You can also request a registration form by calling UC Davis Conference and Event Services at (530) 757-3331.

Getting Past Pesticides

Integrated Pest Management in San Francisco



San Francisco adopted an Integrated Pest Management (IPM) Ordinance in 1996. This Ordinance commits the City to minimize the use of pesticides and instead use methods that pose a lower risk to public and environmental health. This IPM program has radically changed the way our City staff manages pest insects, rodents and weeds.

In San Francisco, IPM means regular monitoring to determine if and when treatments are needed, and employing biological, cultural, mechanical, physical, and educational tactics to prevent pests or keep their numbers down. We emphasize non-chemical control methods, but when pesticides are necessary, we have an approved list of reduced-risk chemicals to meet the need.

Our IPM Program applies to City and County-owned property including an international airport and port, hospitals, golf courses, jails, office buildings, City Hall, rights-of-way and watershed lands, buses and trains, landscaped parks, and natural areas. While each situation requires a unique approach, IPM provides a clear and effective framework that guides all pest management decisions.

Cover: Public Utilities Commission Gardener Supervisor Paul Delgrosso holds a tool that controls weeds with infrared heat.

Above right: IPM specialist Ralph Montana releases beneficial insects to fight pests in Golden Gate Park's Conservatory of Flowers. These natural enemies have replaced many of the insecticides formerly used against common pests of plants grown indoors.



The success of San Francisco's IPM Program depends on the creativity and perseverance of our staff and contractors. This brochure highlights some of the techniques they have employed to find alternatives to pesticides. San Francisco has come a long way since the inception of this innovative program. Similar IPM programs are taking shape in public agencies and school districts across the country. We are eager to share our experiences and to learn from the experiences of others.

Resources

San Francisco Department of the Environment

415/355-3700

www.sfdenvironment.com

Copies of the SF IPM Ordinance, Approved Pesticide List, pest fact sheets

National Pesticide Telecommunications Network (NPTN)

800/858-7378

<http://nptn.orst.edu>

Talk directly to toxicologists about pesticide questions and pesticide referrals

Bio-Integral Resource Center (BIRC)

510/524-2567

www.birc.org

A wide array of publications on plant and animal pests and pesticides

Pesticide Action Network North America (PANNA)

415/981-1771

www.panna.org

Comprehensive database on health effects of pesticides, including endocrine-disrupting issues

University of California Statewide IPM Project

931/752-7591

www.ipm.ucdavis.edu

Information on a 330 local stewardship program and urban IPM

Credits

Coordinator: Tonya Daulton

Text: Sheila Daulton, Debra Raphael, Terrell Smith, Tonya Daulton

Design: Lauren Wald Design

Assistant: Emma Goldstein

Photo Sources: Sally Blum, Debra Raphael, Sheila Daulton

Greg Kocher, Ralph Munoz, Debra Raphael, Lauren Wald Design, City of San Francisco Department of Public Health, Department of San Francisco Pollution Prevention Program



San Francisco Department
of the Environment



San Francisco Public
Utilities Commission

Looking for efficient weed control plus great entertainment? San Francisco has found both by using herds of goats to clear away poison oak and other problem weeds on steep PUC watersheds, open spaces in parks, and in overgrown areas at the airport. Portable electric fences, herding dogs, and shepherds ensure that goats stick to business in target areas.



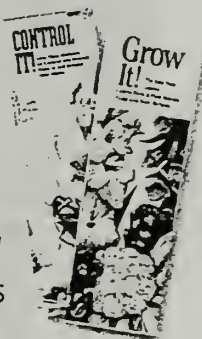
IPM at the San Francisco Public Utilities Commission

San Francisco's Public Utilities Commission (SFPUC) manages extensive watershed and right-of-way lands across Northern California. Its power generating, drinking water, and wastewater systems include over 2,100 miles of pipeline. These vast holdings make the SFPUC San Francisco's largest single IPM practitioner.

The Commission has stepped up to the challenge by developing a detailed IPM plan, appointing coordinators, implementing monitoring and record-keeping systems, and instituting IPM training for its employees. SFPUC has also launched a series of IPM pilot projects to test pesticide alternatives, and conducts ongoing public outreach programs.

SFPUC's IPM successes include:

- Integrating alternative methods including mowing, grazing, controlled burns, and manual removal to suppress weeds on watersheds and rights-of-way
- Using innovative traps and pest-proofing structures to solve rodent problems
- Promoting IPM to the public through the San Francisco Water Pollution Prevention Program's *Our Water, Our World* campaign each spring in stores across the city

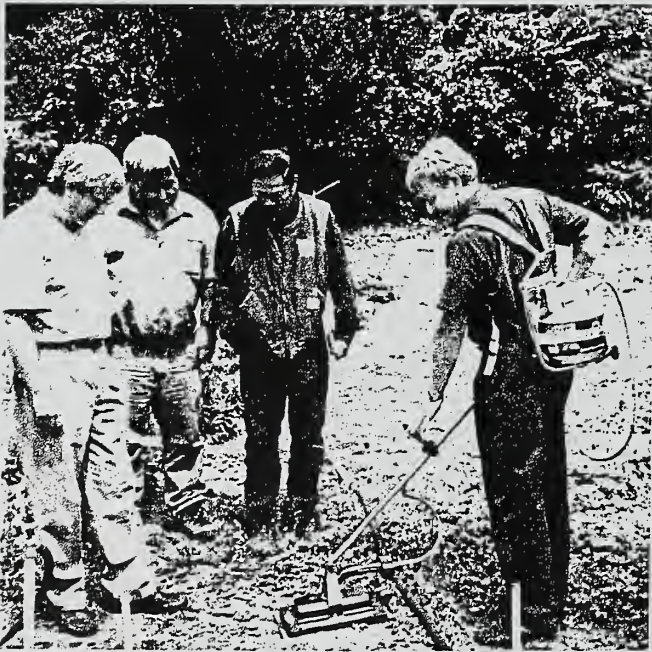


SFPUC management is committed to the future of IPM in San Francisco through continuing staff training and educating customers in order to reduce the use of chemical pesticides.

IPM Accomplishments

There are many ways we measure and recognize successes in our IPM program. Here are just a few accomplishments:

- Passed the first ordinance in the U.S. requiring IPM practices on all City- and County-owned land and buildings
- Eliminated use of the most hazardous pesticides
- Reduced the overall use of pesticides in parks and public spaces by 55%
- Eliminated spray applications of pesticides in and around buildings
- Solved 80% of indoor pest problems reported to the City's structural pest control contractor, without using pesticides
- Implemented many non-chemical control methods, including those highlighted in this brochure



- Provided a wide variety of training programs for gardeners, custodians, carpenters and building managers

- Created the Mayor's Environmental Service Award for staff achievement in IPM



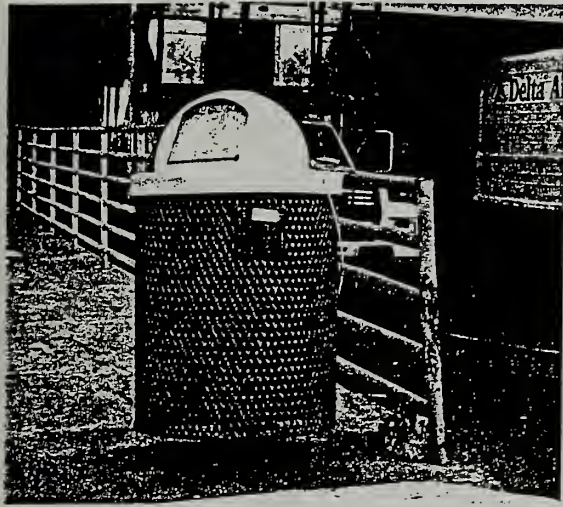
- Developed model IPM contract language and specifications for selecting pest control contractors

- Utilized volunteer labor to control invasive weeds and restore native vegetation

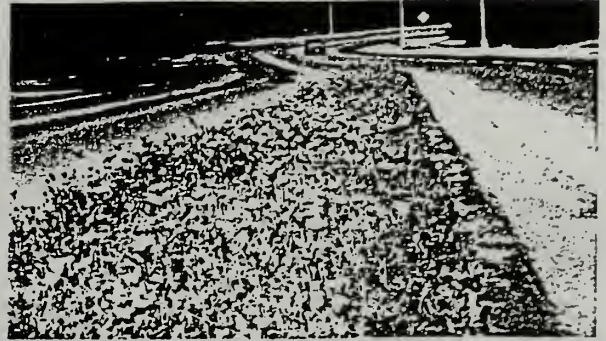


- Cultivated native plants for use in City landscaping without using pesticides
- Developed an approved list of reduced-risk pesticide products based on human health and environmental criteria
- Received the California Department of Pesticide Regulation's 2001 IPM Innovator Award
- Included on-going public input in IPM program development and oversight
- Developed a web site that provides information on the City's IPM Program (www.sfenvironment.com)

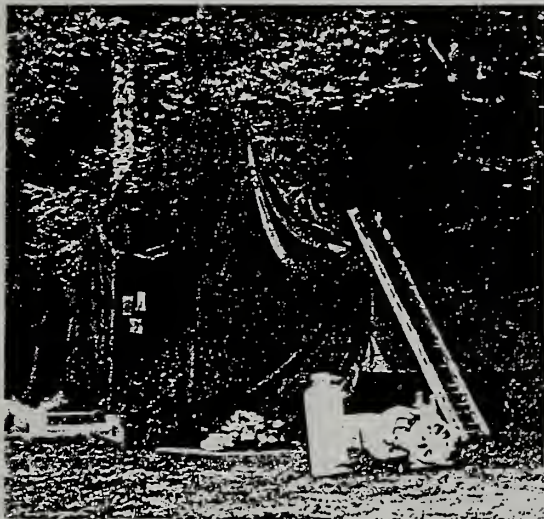
Integrated Pest Management Program



Trash cans are favored habitats for rats. To reduce rat problems, new pest-proofed trash containers have been installed at San Francisco International Airport. These cans have rodent-proofed lids and plastic liners that facilitate frequent emptying of garbage.



Colorful California wildflowers are grown in median strips along San Francisco streets to outcompete weeds. When landscaping budgets are tight, these inexpensive, fast-growing native plants are used to cover bare soil until permanent plantings and weed-blocking mulch can be installed.



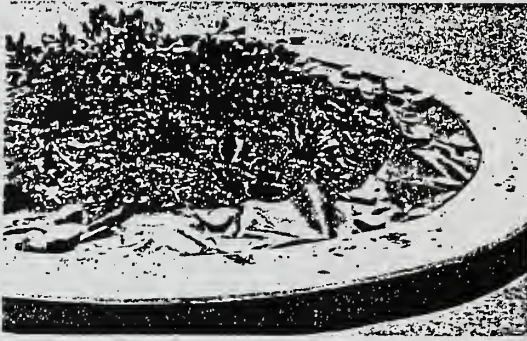
Demonstrations and training programs focusing on IPM-related equipment are ongoing components of citywide iPivi programs. Here, termite-infested buildings are being treated with heat to kill pest insects instead of relying on chemical fumigation.



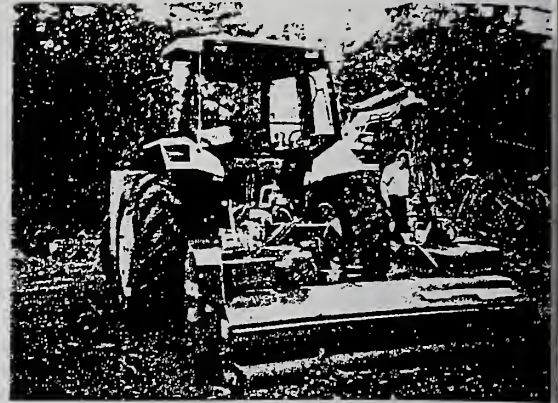
Habitat restoration partnerships with the San Francisco League of Urban Gardeners (SLUG) have helped eliminate weed problems on the Port of San Francisco's shorelands.



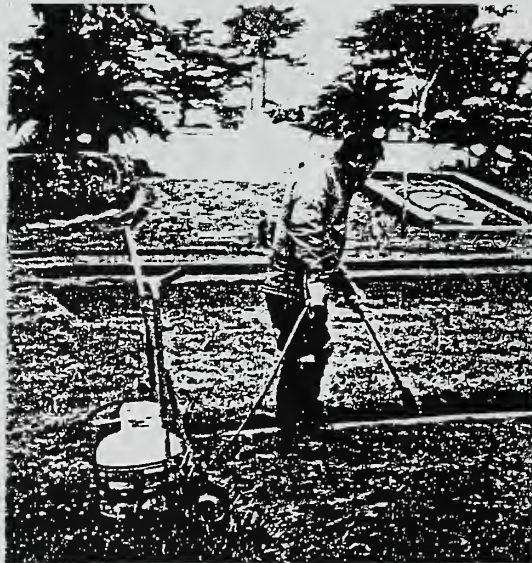
Highlights of San Francisco's Int



Weed-barrier fabric and mulches (shown during installation) prevent weeds from germinating in flower beds. The porous black fabric blocks weeds while allowing air, water and nutrients to pass through to roots of desirable plants.



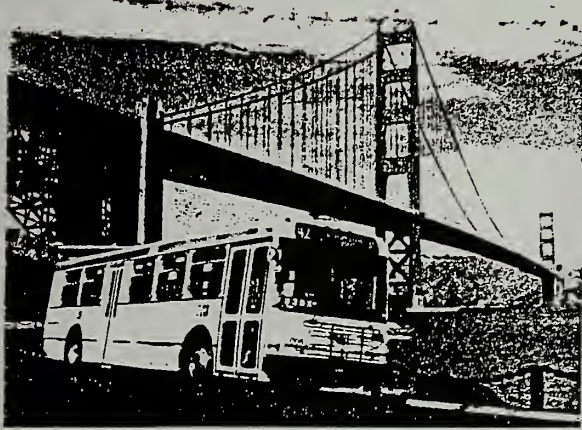
A mower cuts roadside brush in city-owned watersheds. Studies are underway to determine the best frequency and season to mow to suppress flammable woody brush and encourage more resistant vegetation to grow in its place.



Propane torches ("Flamers") are used on green vegetation to suppress young weeds. When the flame is passed quickly over seedling weeds, their cells collapse and the plants dehydrate and die within hours.



Powerful backpack vacuums are used to remove pest insects from cracks and crevices in and around buildings. These portable tools provide quick, non-chemical removal of infestations of cockroaches, spiders, and other 6- and 8-legged critters. Vacuuming is usually followed by caulking to permanently seal cracks that harbor insects. Under IPM, over 80% of indoor pest control service calls have been solved without use of pesticides.



San Francisco's buses and cable cars sometimes attract unwelcomed six-legged riders. Instead of spraying inside where the riders are, MUNI inserts low-toxic insecticidal baits into cracks and crevices to kill pests without harming humans.



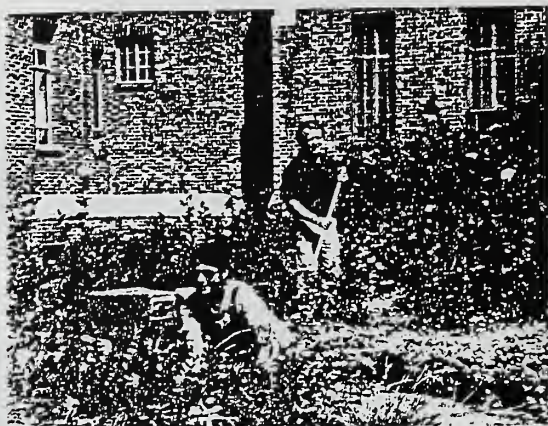
SFPUC vegetation managers identify native perennial grasses used to outcompete weeds and reduce fire hazards on rights-of-way.

The City and County of San Francisco's Integrated Pest Management (IPM) program has come a long way since its inception in the Fall of 1996. While the transition to IPM has been very challenging for City staff, and the work to fully institutionalize IPM is ongoing, the benefits are significant.

In compliance with the 1996 IPM Ordinance, pesticides have been put on the back burner wherever possible and replaced with non-chemical methods. These include combinations of biological, cultural, manual, mechanical, and physical controls such as those shown in this brochure. Pest management decisions are increasingly based on IPM monitoring ac-

tivities that improve predictability and efficacy of pest control while reducing pesticide use.

Thanks to the vision of citizens, environmental groups, and political leaders and the ingenuity and hard work of City staff, San Francisco has made significant changes in the way it solves pest problems wherever they occur. This includes inside City buildings, at its international airport and port, in hospitals, along rights-of-way and watersheds, on buses, golf courses, and in neighborhood parks. Clearly, the lessons learned to date, and the record of pest management victories large and small have made it certain that IPM is here to stay.



Patients and staff at San Francisco General Hospital spend time in an organic flower garden where they can relax or visit in an environment free of toxic pesticides. The gardeners enhance the healing atmosphere by using hardy, pest-resistant plants, weed barriers, and other alternative methods to keep pest numbers low.



Monitoring for disease with soil probes and other tools, use of organic fertilizers and beneficial soil organisms, judicious water management and other cultural practices have substantially reduced pesticide use on the City's pilot IPM golf course. The success of the pilot program has led to implementation of IPM at the City's bowling green and its four other golf courses.

Participants

The development and operation of the San Francisco IPM Program has been a team effort involving staff from many City/County departments, pest control contractors, IPM consultants, and citizen activist organizations. Key participants include:

City/County Departments

- Department of Consumer Assurance
- Department of the Environment
- Municipal Railway
- Port of San Francisco
- Department of Public Health
- Public Utilities Commission
- Department of Public Works
- Recreation and Parks Department
- San Francisco International Airport

Pest Control Contractors

- Pestec Exterminator Co.

IPM Consultants

- Steven Ash/IPM-PCA Associates
- Daar/IPM Consulting Group
- Lyn Hawkins
- Slater Pest Control

Citizen Activist Groups

- Pesticide Watch
- Washington Toxics Coalition





City and County of San Francisco Integrated Pest Management Program

2003 Program Report



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Executive Summary	2
Report.....	2
<i>Introduction.....</i>	<i>2</i>
<i>Reduced-Risk Pesticides List</i>	<i>3</i>
<i>Exemptions.....</i>	<i>4</i>
<i>Pesticide Use Data Collection and Analysis</i>	<i>5</i>
<i>Contract Development.....</i>	<i>5</i>
<i>Training /Conferences</i>	<i>6</i>
<i>Community and Regional Outreach.....</i>	<i>8</i>
<i>Progress by City Departments.....</i>	<i>8</i>
<i>Annual Report Notes.....</i>	<i>10</i>
<i>Future Activities.....</i>	<i>11</i>
<i>Citywide Pesticide Use Trends</i>	<i>12</i>
<i>Department of Public Health.....</i>	<i>22</i>
<i>Department of Public Works.....</i>	<i>26</i>
<i>Department of Transportation (MUNI)</i>	<i>30</i>
<i>Port of San Francisco</i>	<i>34</i>
<i>Public Utilities Commission</i>	<i>39</i>
<i>Department of Recreation and Parks</i>	<i>44</i>
<i>San Francisco International Airport</i>	<i>52</i>

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San Francisco Department of the Environment
Integrated Pest Management Program

INTERIM REPORT 2003

Covering pesticide use data from calendar year 2003
and program activities July 1-December 31, 2003

Debbie Raphael, Toxics Reduction Manager
Chris Geiger, City Toxics Reduction Coordinator
Deanna Simon, City Toxics Reduction Associate

Executive Summary

Pesticide use by San Francisco City Departments has generally continued the downward trend that began with the institution of the Integrated Pest Management Program in 1996. Total pesticides used have fallen by 72-82% (pounds and gallons, respectively) since 1996, with the most popular herbicide (Roundup®) falling by 91% in that period (lbs. of active ingredient). The use of the most toxic Tier I products has declined from approximately 70% to 42% of total use since 1999, when the Tier system was instituted. However, new efforts to control rodents – especially rats – have caused a significant increase in rodenticide use. Rodenticides and golf course herbicides account for most Tier I pesticide use in the City.

Throughout 2003, San Francisco's Integrated Pest Management Program continued to play an active role in reducing pesticide use and pesticide hazards. The program conducted integrated pest management (IPM) trainings for client departments, organized an annual IPM conference, reviewed and updated the City's Reduced-Risk Pesticides List, supported new reduced-risk product-testing, and held monthly meetings of the IPM Technical Advisory Committee, which includes representatives from all major City pesticide users. Other local and state agencies frequently requested information and expertise from San Francisco's IPM Program, an established leader in this field.

Future challenges for the IPM Program include a re-evaluation of the City's rodent management approaches and improvements to the pesticide use reporting system. Also, beginning in 2004, both program activities and pesticide use will be reported by calendar year, at the request of the Commission on the Environment. This interim report on pesticide use covers all pesticide use in the year 2003 for City of San Francisco properties, and program activities for the second half of 2003 only.

Report

Introduction

Chapter 3, Section 305(g) of the Environment Code (Integrated Pest Management Ordinance) requires San Francisco's Department of Environment to report on the progress of its Integrated Pest Management (IPM) Program to the Board of Supervisors. This report is submitted to fulfill that requirement, and summarizes the progress made by San Francisco's IPM Program from July through December, 2003. Included in this information is an analysis of pesticide use data from the calendar year 2003. We have presented this data as a citywide analyses together with specific information for each of the City's seven "big users" of pesticides from 1996 through the end of 2003.

This is an interim report, covering only the last six months of calendar year 2003. In the past, IPM reports have included program activities for fiscal year, but pesticide use data from the previous calendar year, which sometimes proved confusing. It was determined by the Commission on the Environment (January, 2004 meeting) to move to a reporting system based on calendar year for both pesticide use and programmatic activities.

Reduced-Risk Pesticides List

San Francisco's Reduced-Risk Pesticide List (RRPL) represents the pesticide products approved for use under San Francisco's Integrated Pest Management Ordinance (Adopted 10/96, Chapter 3, San Francisco Environmental Code). The list is updated on an as-needed basis to reflect the availability of new reduced risk products and the removal of products with the greatest human health and environmental concern. Products are designated as Allowed (A), Limited Use (L), and Limited Use of Special Concern (L*). Each limited-use product notation is accompanied by the specific circumstances under which it is approved for use. These restrictions are in addition to product label stipulations, which are required by state and federal law.

Integrated Pest Management (IPM) Programs apply a number of elements to control pests while ensuring a safe working and play environment. *Chemical pesticides represent only a single control strategy and are used only as a last resort.* Sanitation, other pest prevention measures, and non-chemical management approaches should all be implemented first. If these measures prove insufficient to control a pest, then the RRPL products may be utilized as tools, according to the restrictions specified for each pesticide product. Other products may be used only by exemption (see "Exemptions" section below).

Four key points about San Francisco's list deserve emphasis:

- **A pesticide list is not an IPM program.** Pesticides should be the last resort, when all other tactics have failed.
- **This list is for institutions, not residents.** Many pesticides on the list were added for specialized purposes not found in residential settings. Homeowners will usually need few or no pesticides to successfully manage common pest problems.
- **Fewer listed products is not necessarily better.** IPM programs require a toolbox of alternatives, for example, alternative attractants in least-toxic ant baits. Therefore, a larger list is indicative of the diversity of pest problems encountered, and does not imply that pesticide use is higher. The important measures of success are: Amount of highly toxic pesticides actually used, and overall effectiveness in pest suppression.
- **The SF RRPL only applies to City and County of San Francisco departments and properties.** Cities are only legally empowered to regulate their own pesticide use, not the pesticide use of residents or businesses.

Table 1 summarizes the changes made in the 2004 RRPL. For more information on the creation of this list, see the *Guide to the City of San Francisco's Reduced-Risk Pesticide List*, on the web at www.sfenvironment.org under "Least-Toxic Pest Management."

Table 1. Summary of 2004 Reduced-Risk Pesticide List changes (numbers of products)

	L* Limited Use, Special Concern <i>(Highest concern)</i>	L Limited Use <i>(Medium concern)</i>	A Allowed <i>(Lowest concern)</i>	Total
Pesticides added to 2003 list	0	9	1	10
Pesticides removed from 2003 list	4	5	4	13
Number of products on 2004 list	7	48	28	83

Exemptions

Under the IPM Ordinance, SFE has the responsibility of reviewing and granting exemptions for the use of pesticides not listed on the Reduced Risk Pesticide List. Applicants must demonstrate that they have made a good-faith effort to find alternatives to the banned pesticide, that effective, economic alternatives to the banned pesticide do not exist for the particular use, and that they have developed a reasonable plan for investigating alternatives to the banned pesticide during the exemption period. Exemptions may be granted as “trial,” “regular,” or “emergency” exemptions:

- ***Trial exemptions*** are granted for the purpose of testing products that show promise as less hazardous alternatives.
- ***Regular exemptions*** are considered for the purpose of managing rare or unforeseen pest problems that cannot be adequately controlled using products on the Reduced-Risk Pesticide List.
- ***Emergency exemptions*** are permitted under the IPM ordinance when a “pest outbreak poses an immediate threat to public health or significant economic damage will result from failure to use a pesticide” on the Reduced-Risk Pesticide List.

SFE received six exemption requests during the second half of 2003 (Table 2). Of these, five were approved. Three of the six exemptions were trial exemptions.

Table 2. Summary of exemptions requested, July 1-December 31, 2003

Date Requested	Dept	Product	Type	Signal Word	Active Ingredient	Pest	Status
8/12/03	Rec&Park	Talstar CA	Regular	Caution	Bifenthrin	sansevieria scale on orchids, plus brown scale and orchid aphid	DENIED
8/22/03	PUC Water	CB-80 Extra	Regular	Caution	Pyrethrins, piperonyl butoxide	mosquito adulticide	APPROVED
9/12/03	Rec&Park	GC-Mite	Trial	Exempt	Cottonseed, clove and garlic oils	mites	APPROVED
9/12/03	Rec&Park	Matran 2	Trial	Exempt	Clove Oil,	weeds	APPROVED
9/12/03	SFIA	GB-1111	Regular	Caution	Aliphatic Petroleum Hydrocarbon	mosquito larvicide	APPROVED
11/14/03	Rec&Park	Rode-trol	Trial	Exempt	Corn oil, dried corn cobs	ground squirrels	APPROVED

Pesticide Use Data Collection and Analysis

Pesticide use data collection is currently accomplished using a customized Microsoft Access database. Pesticide users in various City departments have “satellite” versions of this database, which they use to feed data into the central SFE database. This arrangement has worked fairly well, but is challenging to keep up to date. Frequent changes in US EPA registration numbers, product names, treatment location codes, and other data will increase database maintenance challenges in the future. In the next year, IPM staff will work with the City Dept. of Telecommunication and Information Services to improve these databases – see “Future Directions” section below.

An important measure of the success of the City’s IPM program is the frequency with which pest problems can be resolved without the use of any chemical controls. In 2002, SFE and the City’s primary pest control contractor, Pestec, began experimenting with tracking the number of site visits that did NOT result in pesticide use. 2003 data shows that the majority of structural (i.e. in and around buildings) pest control visits involved prevention, monitoring, physical, and mechanical methods as opposed to chemical control (baits or sprays). In fact, 53% of these visits did not require application of a pesticide (see Fig. 10 in the Citywide section), a 3% decrease over last year’s rate. This data shows that Pestec uses chemicals as a last resort, not as a generic solution.

Contract Development

All structural pest control is conducted by outside contractors except in the Department of Recreation and Parks. In the second half of 2003, SFE continued to work with the City Office of Contract Administration to include specific language and expertise for the new Request for Qualifications (RFQs) and Request for Bids (RFBs) for Citywide structural pest control.

Training /Conferences

Key to the City's successful implementation of its IPM program is the ongoing training of City staff at all levels. SFE staff has been working with City Departments to organize, coordinate and provide a variety of training opportunities. Most training events are free of charge to participating departments and funded from the SFE IPM budget. Listed below is a summary of these training events, emphasizing those in the second half of 2003:

Technical Advisory Committee (TAC) Meetings: Each month a Technical Advisory Committee Meeting convenes to exchange information and discuss current pest control techniques, and representatives from the seven "big user" departments meet to discuss implementation of the IPM program. Most meetings feature a speaker on technical subjects of interest to the group. Participants include departmental IPM Coordinators, safety and environmental compliance staff, pest control contractors, independent IPM experts, and community members. The City Toxics Reduction Coordinator from SFE chairs these meetings and sets the agendas.

Topics in the second half of 2003 included guest speakers on the following:

- June-Bug Away Bugs (pest repellent trash bags), Ed Katz, Steed Marketing; and Spare the Air, Jim Smith, BAAQMD
- July- The SF Transition from Chlorine to Chloramines, Jim Solerno Water Quality Bureau and Lillian Brown SFPUC
- August- Secondary kill from rodenticides, Terry Salmon UCSD
- September- West Nile Virus Update, Helen Zverina and Jack Breslin SFDPH
- October- Using Goats to Control Weeds in Sensitive Areas, Living Systems Land Management staff
- November- Gardening for Wildlife, Don Mahone Strybing Arboretum nursery
- December- No meeting due to holiday schedules

Site Specific Workshops and Training: SFE worked with several departments to offer pesticide safety training to their staff serving as pesticide applicators. SFE staff also schedule special trainings and arrange for continuing education credit issued by the California Department of Pesticide Regulation.

Training sessions held in 2003 are summarized:

January 2003 – December 2003

Monthly IPM Technical Advisory Committee Meetings

2 hours each, 8 sessions, 16 hours total

Approximately 20-25 attendees each month

January 2003-December 2003

Field Trips (in lieu of monthly meetings)

2 trips, 5 hours each, total of 10 hours

Approximately 12 attendees per trip

January 2003

Annual IPM Conference

7 hours total

250 attendees

April 2003

Recreation and Parks Pesticide Use Safety Training

2 session of 4 hours each, 8 hours total

Approximately 200 staff trained

April 2003

Public Utilities Commission Pesticide Use Safety Training

2 session of 4 hours each, 8 hours total

Approximately 80 staff trained

June 2003

Propane Weed Torch Safety and Use Training

2 hours total

20 staff trained

July 2003

Mosquito Abatement Trainings

2 full-day workshops, 7 hours each, 14 hours total

Approximately 60 staff trained

Summary of trainings - 2003

Full day trainings: 3

Half-day trainings: 6

2-hour trainings: 9

Total number of trainings = 18 trainings ranging from 2 hours to all day.

Total person-hours of trainings = 5,390 person-hours

Additionally, the SFE IPM Program worked with the Dept. of Recreation and Parks to put on a series of sustainable landscape workshops for San Francisco City gardeners. Topics discussed at the workshops included:

- Best Plants for Drought and Wind Tolerance and Habitat Needs
- Design Dialog
- Pollinator Planting
- Managing Volunteers
- Latest and Greatest Technologies in the Fight Against Weeds
- Environmental Education Workshop
- Composting and Recycling at McLaren Park
- Permaculture Field Trip

SFE will continue to work with the Departments to identify training needs and opportunities.

Community and Regional Outreach

Web Site: The IPM section of the website is the most commonly visited part of the Dept. of the Environment web site (www.sfenvironment.org), and people tend to go directly to the pests section. The website is used to assist City Departments and the public with new information on such topics as bed bugs and the West Nile virus.

Urban Pesticide Committee: IPM Program staff actively participated in meetings of the Urban Pesticide Committee, an interagency group organized by the Regional Water Quality Control Board to address pesticide runoff issues.

Written Materials:

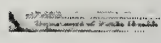
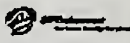
- *Water bill insert on mosquito biology and breeding habits (see side box):* A collaborative effort of SFE, SF Dept. of Public Health, and PUC.
- *Mosquito and West Nile virus information package:* Developed by IPM Program with publications from in-house and outside sources.
- *Homeowner's Pest Fact Sheet (English and Chinese):* Developed by IPM Program in coordination with the SFE Household Hazardous Waste Program, for distribution at one-day HHW collection events and other IPM outreach events.
- *It! Guides (Control It!, Grow It!):* SFE continues to work with PUC to make sure the It! Guides (Control It!, Grow It!, etc...) are available to interested people through our EcoCenter and at other community events.
- *City IPM Newsletter:* Members of the IPM TAC requested that SFE create a citywide newsletter that publicizes the IPM Program to City employees. Newsletters reach additional staff members not able to take advantage of the SFE TAC meetings, training and conferences. The first edition was created in June 2003 and TAC members will work on improving it to suit their needs (see Attachment B).

The IPM Program has also developed two new outreach materials for distribution at the Flower and Garden Show, Household Toxics Collection days, Recreation and Park plant sales and outreach events, and to school children through our school education program. Materials recently developed:

- *"Chip Clip"* to seal up food bags
Message: "Snap Your Snacks: Your Crumbs are a Bug's Banquet".
- *Bookmark with embedded seeds to grow plants attractive to beneficial insects*
Message: "It's a Bug Eat Bug World" and "Spraying kills the good bugs too", plus basic good bug identification

Progress by City Departments

Port of San Francisco – The Port hired an additional gardener in 2003. SFE and the City IPM Consultant worked with Port staff to develop an IPM Demonstration Pilot Program to test the



MOSQUITOES-WHAT CAN I DO?
Prevent Mosquito Breeding:
Eliminate standing water at home or work.

- Empty flower pots, pool covers, boats
- Remove tires and car parts or keep indoors
- Clear gutters and drains of debris often
- Drill holes in large containers
- Report potholes, broken sidewalks
- Install pumps or larvae-eating fish in ponds
- Cut back shrubbery where mosquitoes hide

Use Personal Protection:

- Avoid the outdoors at dawn and dusk
- Wear long sleeves and long pants
- Use a repellent with DEET- Read label for safe use

Report mosquito problems:
SF-DPH Environmental Health Section information/advice:
415-252-3805

For more information:
www.ipm.ucdavis.edu/PMGPESTNOTES/pn7451.html

effect of mycorrhizal fungi inoculation on plant health. In addition, the Port was awarded a Toxics Reduction Grant by SFE to purchase a wood chipper for creating chipped mulch material to reduce weeds. Extensive areas have been mulched with chips, with reported results including increased soil health, reduced weeds, and less erosion.

Department of Public Works – The Department of Public Works has reorganized its landscaping operations and is reviewing and updating its IPM Plan. SFE and the City IPM Consultant worked with DPW to develop an IPM Demonstration Pilot Project to showcase the use of weed fabric, bark mulch, and xeriscape plants in median strips and sidewalk plantings. Project areas remain healthy, meet meridian vegetation requirements, and continue to need minimal or no maintenance.

SFE has also worked with the DPW Urban Forestry program to achieve its IPM goals. This included the re-introduction of RoundUp use in road median areas with tall weed growth, where hand-weeding or weed-whacking would present a danger to workers. These areas, in order of priority, will be converted to weed cloth and mulch plantings, per the Demonstration Pilot Project, as time and funds allow.

Department of Recreation and Parks – The Department of Recreation & Parks re-opened the Conservatory of Flowers, the remodel of which included pest management design such as rooms for isolation of infested plants, screened vents, and pond design that facilitates cleaning and maintenance.

SFE has been working with R&P staff to address several challenges this year, including Sharp Park rodent control; use of compost tea, EM1, compost, and mulch/bark chips on golf courses and other areas; mosquito control, and the introduction of several weed species into high-profile turf areas. SFE will continue to assist R&P staff to implement alternative IPM methods with assistance ranging from coordination with Norcal to secure compost to research and training on new and alternative methods. The R&P IPM Team has continued their leadership in exploring new, reduced-risk pest management methods and continues to be a leader in this regard.

Department of Public Health – Laguna Honda Hospital has been actively using IPM during the preconstruction phase of remodeling. A coordinated IPM and Green Building effort will continue throughout the construction and post-construction phases. SF General Hospital has made a special effort to avoid any pesticide use due to the possible sensitivities of its immune-suppressed patients, and conducts all of its weed control efforts manually or using soap products. SF Environment has been working closely with General Hospital's gardening and IPM staff to ensure compliance with the IPM Ordinance, reaching out with more trainings, and making a special effort to ensure DPH staff are invited to all presentations. In addition, SFE has brokered unprecedented cooperation among DPH and other City departments to address the concerns of mosquito management and West Nile Virus prevention, cooperated with DPH in creating and distributing education and outreach materials, and helped identify areas of improvement in DPH's Citywide mosquito management plans.

Department of Transportation (MUNI) – Coaches and facilities have incorporated IPM techniques in identifying pests and in choosing control alternatives. While rat management efforts and rodenticide use have increased significantly percentagewise, the general levels of pesticide use by MUNI remains quite low.

Public Utilities Commission – The PUC has been experimenting with the use of goats on pipeline rights-of-way, especially in residential areas where other techniques (such as burning or herbicides) might prove objectionable. They have also increased their use of mechanical weed controls, and decreased use of Roundup. Mosquito controls have increasingly emphasized elimination of habitat and use of least-toxic larvicides when necessary. Amounts of pesticides used has leveled off after dramatic reductions earlier in the program. Herbicide use has steadily decreased, while rodenticides and mosquito treatments have increased.

San Francisco International Airport – SFIA has seen major expansion in recent years, without corresponding increases in landscape staffing. As a result, herbicide use has begun to creep upward again after early reductions. Mosquito larvicide use—mostly microbial Tier III products—has increased considerably due to concerns over mosquito-vectored diseases. Coordination of multiple pest control efforts by numerous independent contractors remains a challenge at SFIA.

Annual Report Notes

The trends noted in this report are drawn from pesticide use data collected by the big seven City departments and the Citywide pest control contractor since the passage of the Integrated Pest Management Ordinance in 1996.

San Francisco utilizes a system for evaluating the toxicity of pesticides developed by Dr. Philip Dickey of the Washington Toxics Coalition. SFE considers this approach to be an example of “anticipatory action to prevent harm,” as required by the City’s Precautionary Principle Ordinance (SF Environment Code, Chapter 1). This system allows the City to look beyond the signal word and acute toxicity of a product and instead evaluate pesticides for such factors as chronic effects (i.e. cancer, reproductive harm), environmental effects (i.e. persistence, bioaccumulation, mobility, water quality), and non-target effects (i.e. impact on wildlife, bees). Using these criteria, products are grouped into tiers with Tier I being the most toxic, Tier II as products of medium toxicity, Tier III as least toxic, and Tier IV products not having enough information for evaluation. It is interesting to note that many of the products from Tier I carry a signal word of “Caution” (least acute toxicity). This illustrates the problem with relying on the signal word on a pesticide product label to select pesticides in an IPM program.

The goals of the SF IPM program are to effectively manage pests, emphasize prevention and non-chemical controls, and in so doing to reduce both the amount and toxicity of pesticides used. However, measuring the success of an IPM program is a complex task. Before drawing conclusions from pesticide use statistics, it is important to consider these factors:

- **Long-term trends are more important than short-term.** Pesticide use always varies somewhat from year to year due to weather, pest pressure, special renovation projects, or other factors. A change in pesticide use from the previous year does not necessarily indicate a long-term trend.
- **Exposure potential is as important as toxicity in determining risk.** A key aim of a pest management program is the reduction of risk. Risk is primarily determined by two factors: Toxicity (for example, how much chemical is required to impair a human or other animal) and exposure (for example, how much of the chemical is likely to actually reach a human or other animal). This means that the formulation and use of the products is all-important. For

example, pesticides applied as aerosol sprays have much higher exposure potential—and therefore pose a greater risk—than pesticides encased in tamperproof bait boxes.

- **Pounds and gallons used can be deceptive.** Use statistics expressed in pounds and gallons mask the specific products used, and do not necessarily reflect levels of risk posed by pesticides. For example, some products—such as elemental sulfur fungicide, or corn gluten meal—may be relatively nontoxic, but require high application rates to be effective. Another factor not illuminated by overall use statistics is the varying amount of active ingredient (ai) in different formulations. For example, Vanquish (ai=dicamba 57%) and Proturf New KOG Weed Control (ai=dicamba 0.07%) both contain the same active ingredient, but Vanquish is a concentrate.
- **Administrative/budget impacts are also important.** Increases in the number of buildings or outdoor acres maintained, decreases in landscaping staff, or underfunding can increase the pressure for “quick fix” pesticide spraying, instead of long-term, preventative, IPM solutions. Conversely, maintenance delayed (for example, by budgetary restraints) can lead to more serious problems in the future.
- **Ineffective pest management also poses risks.** West Nile virus transmitted by mosquitoes, allergies or asthma caused by cockroaches, and enteric diseases spread by rats are a few examples of hazards posed by pests themselves. It is important to remember that San Francisco’s IPM Program has dual aims: Reduction of pesticide hazards and effective pest management.
- **These data do not represent residential or commercial pest management trends.**

Future Activities

Change of report coverage: *This is an interim report*, covering only the last six months of calendar year 2003. In the past, IPM reports have included program activities for fiscal year, but pesticide use data from the previous calendar year, which sometimes proved confusing. It was determined by the Commission on the Environment (January, 2004 meeting) to move to a reporting system based on calendar year.

Database improvements: Planned improvements include:

- Improved tracking of exemption requests.
- Standardization of several fields to improve reporting
- Improved ability to track pesticide use based on pounds of *active ingredient* used. This is a much more informative approach than simply reporting pounds of product used.
- Improved ability to track pesticide use based on Hazard Tier, Use Category (A, L, L*), pesticide type (herbicide, fungicide, etc...), and SF City Approved status.
- Streamlined report generation

Pesticide use data collection and analysis improvements: Plans for the future improvement of non-chemical pest control tracking are in the works, and we hope to implement a system where we can identify specific non-toxic actions such as sanitation, trapping, mechanical weed control, exclusion, and more.

Citywide Pesticide Use Trends

General trends

Table 3. Key Citywide Pesticide Use Statistics

Since the beginning of the IPM Program in 1996:

72% reduction (lbs. of product)	Total pesticide use since 1996, excluding rodenticides
82% reduction (gals. product)	
91% reduction (lbs. of active ingredient)	Glyphosate (Roundup® active ingredient) use since 1996
103% increase (lbs. of product)	Rodenticide use since 1996

Since 1999 (Beginning of Tier system):

37% reduction (lbs. of product)	Tier I (highest toxicity) total pesticide (including rodenticides in pounds, not gallons)
66% reduction (gals. of product)	
28% reduction (% of total use)	Tier I percentage of total pesticides used (in pounds + gallons); from 70% in 1999 to 42% in 2003

Since last year (2002):

34% reduction (lbs. of product)	Total pesticide use since 2002, excluding rodenticides
42% reduction (gals. of product)	
42% increase (lbs. of product)	Tier I (highest toxicity) total pesticide use since 2002
170% increase (gals. of product)	
71% reduction (lbs. of active ingredient)	Glyphosate (Roundup® active ingredient) use since 2002
28% decrease (lbs. of product)	Rodenticide use since 2002

The most consistent overall trend is the sharp decrease in pesticide use in the beginning of the program, an increase over the next few years through 1999, 2000, 2001, and a decrease since then. It is important to note that the Integrated Pest Management Ordinance, when first implemented, was misunderstood and misapplied. Many departments simply eliminated pesticide use at first, causing very low pesticide use numbers for the first year of the program. However, because the sudden decrease in pesticide use was not replaced with other management efforts, pest populations (weeds, insects, and vertebrates) built up over that period. Once this situation was understood, IPM Program staff worked with City staff to explore less-toxic products and alternative techniques that could effectively control pests. Hence, the increased pesticide use between 1997 and 1999 reflects an adjustment period when City staff brought runaway pest

populations back under control, while adapting and developing less-toxic techniques. Because we did not track pesticide use before the ordinance, we cannot know if the increase reached back to previous levels or remained lower than in the past.

As the program has grown and matured, we have successfully worked with pest managers to use smaller quantities of pesticide products, in more directed applications, and only when other options (such as preventive measures or cultural, mechanical, and biological controls) have been exhausted. Trial and error, along with gradual testing of new products and methods has led to the overall decrease in amount of pesticides used over the past few years. Citywide pesticide use records in San Francisco from 1996 through 2002 indicate a decrease in general pesticide use (Figs. 1&2), lower quantities used per application (Fig. 3), and a 91% decrease in Roundup® herbicide use (Fig. 4). Tier I products, those with the highest toxicity concerns, are steadily decreasing in both solid and liquid formulations (Fig. 5). The increase in lower risk Tier II and Tier III products (most of which have a "Caution" label) parallels the Tier I decrease, indicating the steady replacement of more toxic products with less toxic alternatives (Figs. 6&7). The sharp decrease in amount used per application (Fig. 3) is indicative of our move from broadcast to highly targeted applications. Because of renewed attention to rat management throughout the city, rodenticide use is one area where a decrease is not expected, resulting in increased rodenticide use (Figs. 8&9). Overall use of liquid pesticide formulations is decreasing citywide (Figs. 12&13). This reflects the movement away from sprays and toward the use of baits. This is considered a positive result, since the use of baits considerably reduces the potential for human exposure.

Structural pest control

The majority of structural pest control (i.e. in and around buildings) is performed by the City's pest control contractor, Pestec. The exception is structural pest control at the San Francisco International Airport which is done by another contractor, Applied Pest Management. This year's list of pests include bed bugs, cockroaches, fleas, mosquitoes (larvae and adult), spiders, silverfish, ants, rats and mice, gnats and flies/maggots, ticks, wasps, gophers, pigeons, cats, and dead animals.

Prevention, monitoring, and nonchemical control options should constitute the core of a true IPM program. In the case of San Francisco's structural IPM, more than half (53%) of Pestec's visits in 2003 did not require application of a pesticide (Fig. 10). However, this percentage has decreased over the last 2 years (82% in 2001 and 56% in 2002), due largely to Pestec's increase in mosquito control efforts for catch basins and at water treatment facilities. Additionally, Pestec has been doing an increasing amount of rodent (especially rat) control for which baits are often used.

Rodenticide use on the rise due to more concerted control efforts

Rodenticides accounted for about 68% of the overall citywide

An Important

Note on Rodenticides:

Single-feeding products have higher toxicity concerns due to elevated concentrations of active ingredient in the target pest at a given time (ie: if it is eaten, the predator is more likely to be adversely affected). Multiple-feeding products administer smaller amounts of active ingredient to the target pest, but are used over a longer time to achieve the same control results, therefore decreasing the risk of secondary toxicity to non-target predatory animals. Therefore, products with less concern over secondary toxicity must be used in larger quantities to achieve results (rodent control). This may skew the picture of rodenticide use in the City. Please keep this in mind when viewing the increasing use of rodenticides over recent years, as it often reflects not only increased vertebrate management efforts, but also the move toward potentially less toxic products (which by nature need to be used in larger quantities).

pesticide use in 2003 (Fig. 8), and—along with turf herbicides and fungicides—account for the majority of the City’s Tier I and Tier II product use. Rodenticide use has increased due to a renewed effort to control long-standing rodent problems.

The rodenticides active ingredient of greatest concern is brodifacoum, which is found in the most commonly used rodenticide for City property pest control in 2003 (Table 4, Fig. 9). There are emerging concerns over secondary toxicity of brodifacoum, that is, hazards to non-target predatory animals consuming dead or dying pest species. However, most of this chemical was used to control rats in areas where chances of secondary toxicity are very low (such as under sewer access covers or covered catch basins). With an active ingredient percentage of 0.005%, the 512 total pounds of product containing brodifacoum (down from 681 in 2002) amounts to 0.0256 pounds, or 0.41 ounces of this chemical used Citywide in 2003. Despite this seemingly low amount, secondary toxicity concerns documented recently by the US EPA warrant a move to safer, effective alternatives. In consultation with the IPM TAC, we have removed most products containing brodifacoum from the updated 2004 reduced risk pesticide list. Use of products with this active ingredient are therefore expected to decrease to zero over the next two years as existing product stores are used up replaced with alternative products.

Table 4. Top rodenticide products used in 2003					
Product	HazTier	Lbs.Used	Active Ingredient	Act.Ing. lbs	
Weatherblok bait with bitrex	I	512.0994	brodifacoum 0.005%	0.0256	
Ditrac super-size blox	II	496.75	diphacinone 0.005%	0.0248	
Eaton’s all-weather bait blocks rodenticide	II	415.625	diphacinone 0.005%	0.0208	
Eaton’s answer for the control of pocket gophers	II	369.125	diphacinone 0.005%	0.0185	
Maki mini block	I	284.625	bromadiolone 0.005%	0.0142	
Generation mini blocks	IV	95.0625	difethialone 0.0025%	0.0024	
Contrac all-weather blox	I	65.5625	bromadiolone 0.005%	0.0033	
JB Eaton Top Gun All Weather BaitBlock	II	30.5625	bromethalin 0.01%	0.0031	

Glyphosate (*RoundUp*, *Rodeo*) use levels off as alternative methods increase

The herbicide glyphosate has gained a high profile due more to its overuse than to its actual toxicity. The wholesale use of the product on genetically engineered, glyphosate-resistant crops has made “Roundup” a household word. However, the downstream effects of such high-volume use—particularly on aquatic ecosystems—are still unclear, and the precautionary principle suggests that safer weed control methods should be used whenever possible.

San Francisco has experienced a consistent downward trend in the use of *RoundUp* products, which has decreased by 91% since 1996 (lbs. of active ingredient – see Fig. 4). The use of dry formulations has accounted for a relatively minor portion of total use, although City staff, especially Recreation and Parks Department, are increasing their use of the dry product due to toxicity concerns related to inert ingredients in the liquid version. Additionally, the solid formulations of products containing glyphosate can help to decrease spills, reduce the difficulty of cleanup, and reduce worker exposure due to splashing and contamination of container covers.

Much of the decrease in glyphosate-containing products is due to staff moving away from broadcast applications and increasing spot applications. Additional strategies that have contributed to this decrease in glyphosate use include: the use of weed fabric and bark mulches

to inhibit weed growth; pressure-washing sidewalk cracks to remove soil and seeds, improvements to plant health to out-compete weed species; increases in hand weeding, weed whacking, and mowing to control vegetation; re-evaluating and decreasing pesticide use in areas where weeds are present but do not need to be controlled; and redefining some previous weeds as “groundcover” or “ornamental”. For example, English daisies were removed from park turf in the past, but are now allowed to grow as ornamentals (except on golf courses, where they interfere with golfers’ ability to locate errant balls).

Rodeo® Aquatic Herbicide has the same active ingredient (glyphosate) as Roundup®, and its use has decreased dramatically to 3.7 gallons in 2003. This is encouraging, as a major ecological concern of glyphosate is toxicity to nontarget aquatic plants and their associated animal communities.

Much of the RoundUp used in 2002 and 2003 was at the Harding-Fleming Golf Course. A major golf course renovation project in 2002 used herbicides to rid the course of kikuyu grass in order to reduce herbicide use for this weed in the future. Though it has worked and kikuyu remains under control at the course, other weeds have invaded and must be controlled to maintain the high standards required by the PGA Tournament to be held there. (See Rec & Park section below).

The trends in the data show that the City may be leveling off in the total amount of RoundUp used on City property (Fig. 11). The use of spray herbicides is difficult to reduce in dangerous areas such as street and highway medians, where safety concerns are such that City staff must spend as little time in those areas as possible. Further reductions may be possible for other uses, such as sidewalk and pavement cracks, and spot weeding in City parks. The primary barrier to reducing RoundUp use is the additional staff time required for some mechanical controls. In many instances, City Departments may need additional time and monetary resources to achieve significant further reductions without decreasing the quality of their weed-management efforts. Also, the ongoing expansion of the San Francisco International Airport is expected to increase herbicide in coming years (see “SFIA” section of this report for more information).

Highest toxicity products on the decline while lowest risk product use increases

In general, the City is moving away from the most toxic pesticide products and is instead choosing products that are safer for the environment and public health (Figs. 5,6&7). The use of products labeled with the signal word of Danger (greatest acute toxicity) has been totally eliminated on city property. The organophosphate insecticides diazinon and chlorpyrifos—known surface water contaminants that are the subjects of numerous federal and state pesticide reduction programs—have been completely eliminated in City operations.

Dry products labeled as Warning decreased until 2002 (96 lbs) but are up 383% to 464 lbs in 2003 (Fig. 12). This is due to increased use of Proturf New K-O-G Weed Control herbicide on high-profile turf areas (see “Recreation and Parks Department” section). Liquid formulations of both Caution- and Warning-labeled products have decreased since 1996 (97% reduction in Warning, 77% reduction Caution). This trend toward dry formulations is expected to continue as the City moves further toward the use of bait products, which have less potential for human exposure than liquid sprays.

It is important to remember is that the "Caution, Warning, Danger" system offers limited information, as it is only based on acute human health effects. Although relevant for some product uses, it is of less concern when exposure potential or the amount of active ingredient is low, for example, in self-contained baits. In such cases other measures of toxicity are of more concern, and the "Caution, Warning, Danger" proves inadequate for decision-making.

The San Francisco IPM Program therefore created a tier-rating system to more fully evaluate pesticide hazards. This categorization, developed by Dr. Philip Dickey, additionally takes into account the product's environmental and chronic human health effects, allowing us to evaluate a pesticide based on multiple factors (see the report, "Guide to San Francisco's Reduced-Risk Pesticide List," on the SFE website under "Innovative Programs/Least Toxic Pest Management/Reduced-Risk Pesticide List. Or go directly to the URL at: http://www.sfenvironment.com/aboutus/innovative/ipm/pest_list05/Approved_List_Guide.pdf) Using this information, a tier ranking is assigned, with Tier I products being of highest concern, and Tier III carrying the lowest risk. The tier system does not take exposure potential into account; this consideration is very situation specific and is accounted for in the "Use Limitations" section of the Reduced Risk Pesticide List (Attachment A) as well as on a case-by-case basis by City staff.

The tier rating system was not implemented until 1999, when we evaluated all products in use at that time. Tier I product use may therefore be underreported previous to 1999, since those are the products we were most likely to eliminate in the first years of the program. For this reason, we have only analyzed data collected since 1999.

However, it is significant to note that the use of Tier I pesticide products has declined by 37% in dry amounts and 66% in liquid amounts over the time we have been tracking these classifications (Fig. 5). The overall amount of Tier I products used is up from last year due to increased use of Proturf New K-O-G weed control on high-profile greens (see "Recreation and Parks Department" section) and several rodenticides used citywide. The dry Tier II products have increased due to large increases in rodent management efforts (Figs. 6&8) while use of liquid formulations has remained approximately stable. Finally, dry Tier III pesticide products have increased by 663% while liquid Tier III products have remained approximately stable (Fig. 7). This increase in the least toxic product category (Tier III) is encouraging, as it shows that Departments are testing and using safer, reduced risk, alternative products over traditional, more toxic ones.

Excluded data: Some data that would skew the picture are not included in analyses

The numbers reported (except in Fig. 1) exclude the use of Bioweed and Suppressa (both herbicides using corn gluten meal as an active ingredient). The use of these Tier III products requires unusually large quantities of material, skewing the graphs. Bioweed was used only in 2000 before its use was discontinued (the large amounts needed were not feasible). The use of Suppressa is on the decline as well. Because this product is food grade and 100% non-toxic, we feel comfortable excluding these outlier numbers from our reports in general.

Citywide Pesticide Use Graphs

Figure 1.

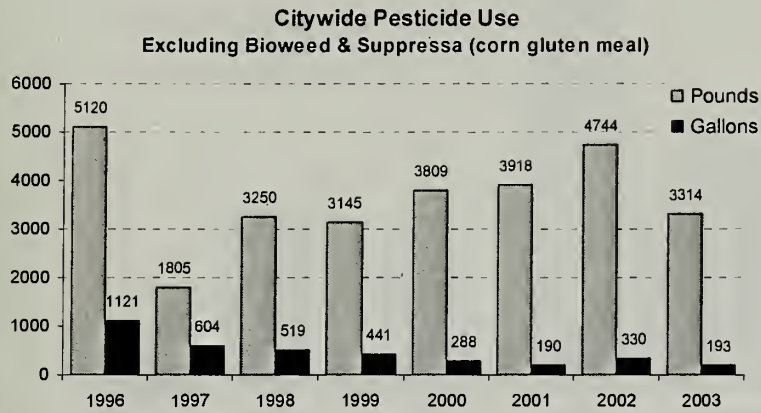


Figure 2.

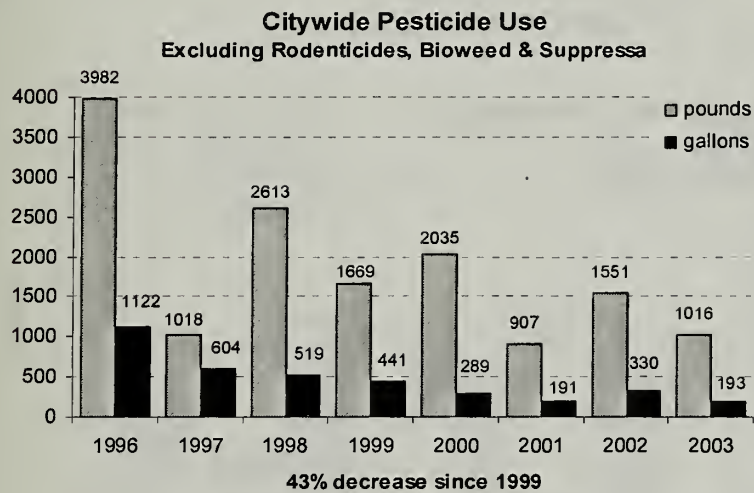


Figure 3. Average amount of pesticide per application

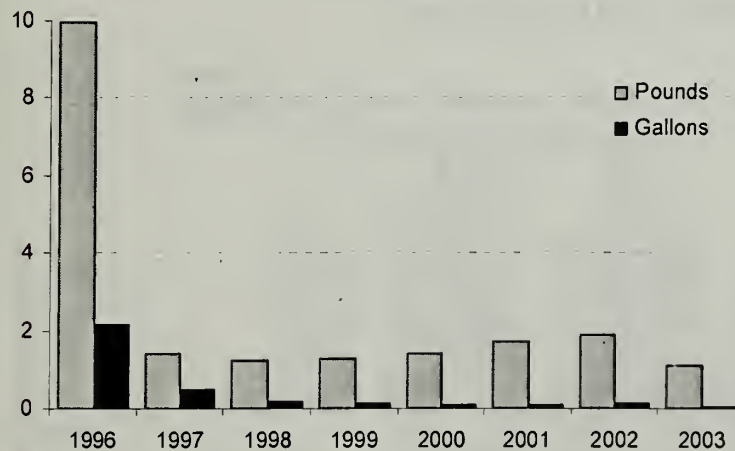


Figure 4

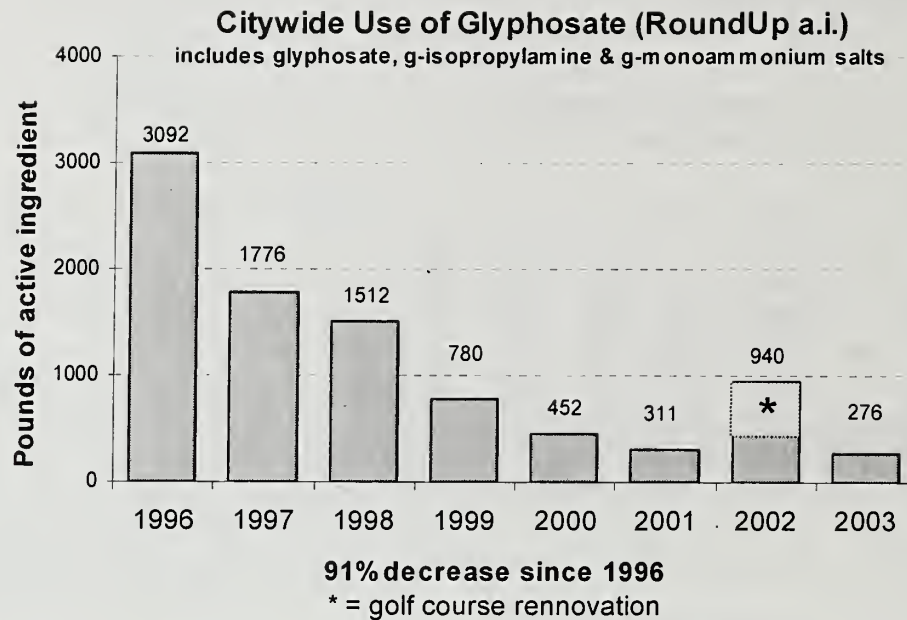


Figure 5 (includes rodenticide use)

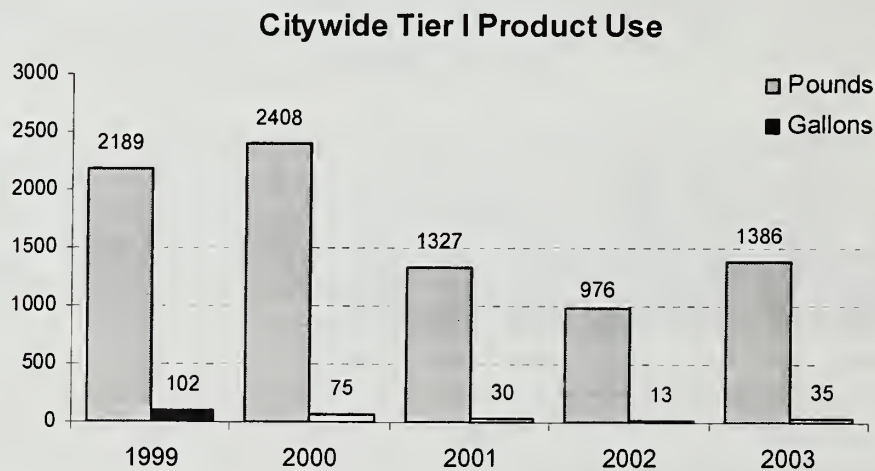


Figure 6

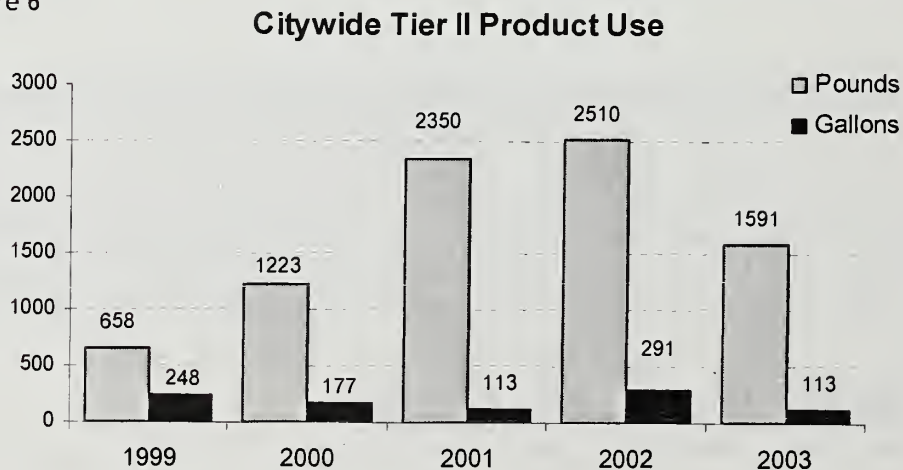


Figure 7

Citywide Tier III Pesticide Use

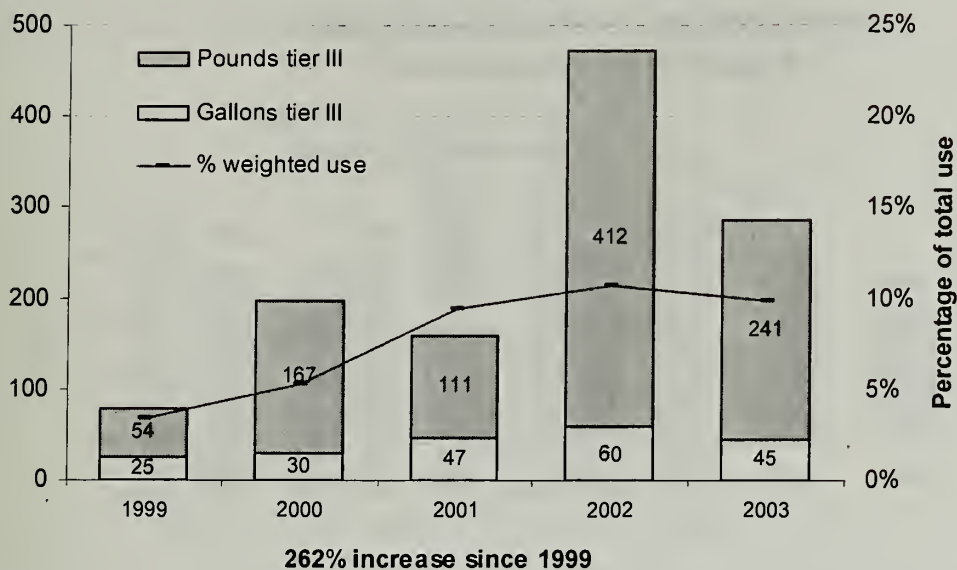


Figure 8

Citywide Rodenticide Use

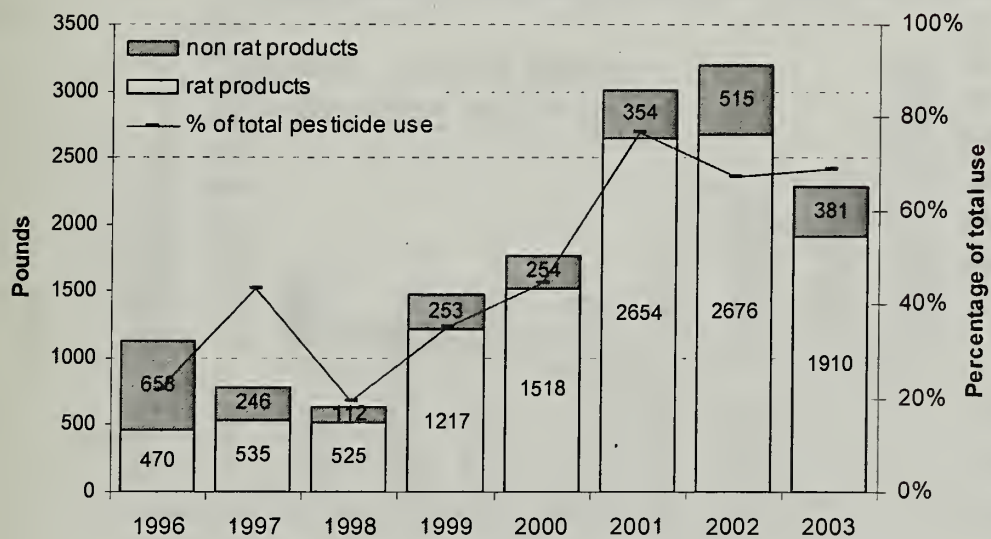


Figure 9

Citywide Use of Rodenticide Products Containing Brodifacoum

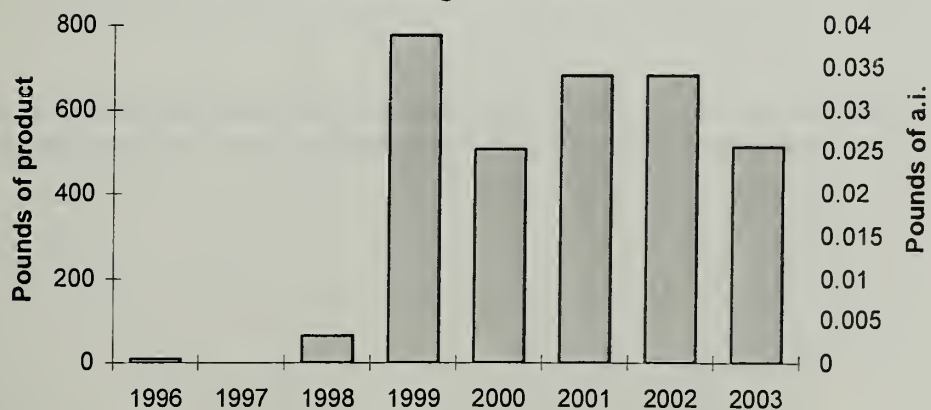


Figure 10

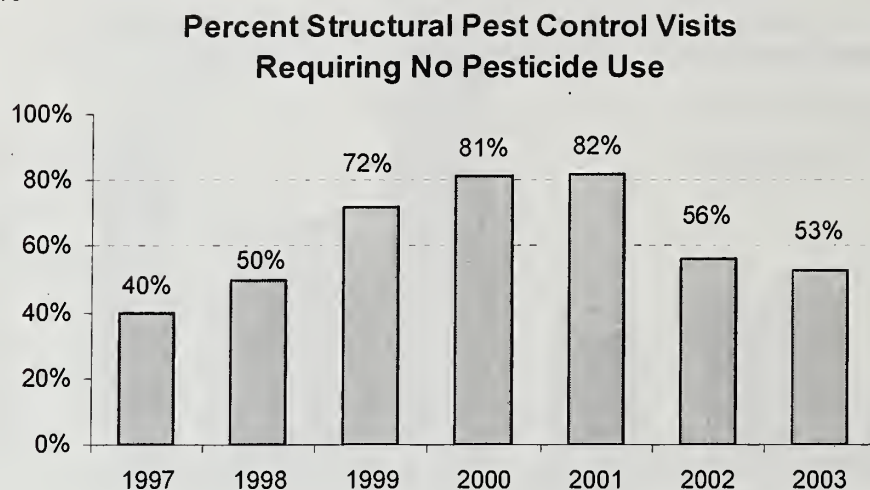
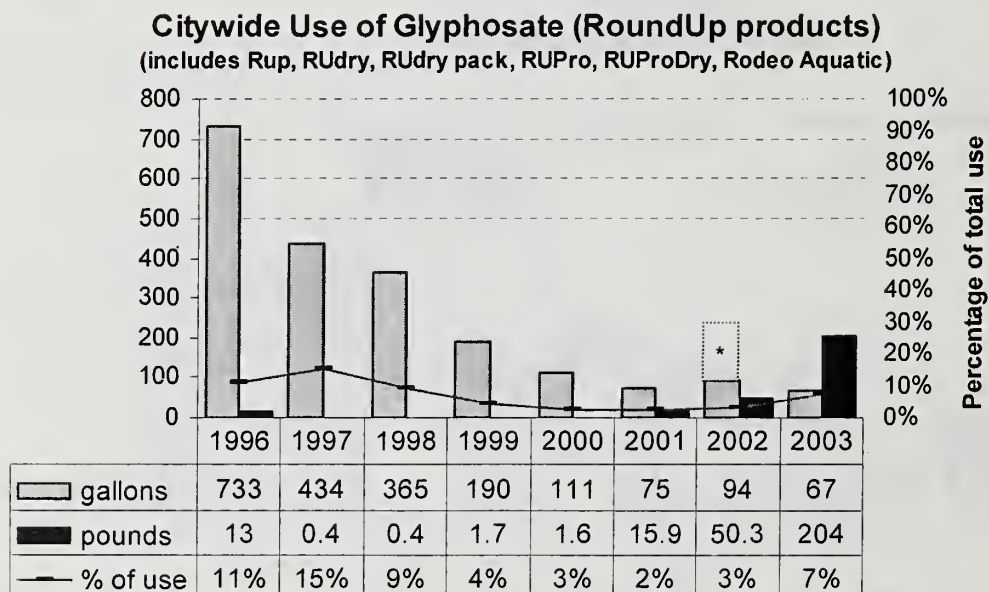


Figure 11



65% decrease since 1999

*140 gals for golf course renovation brings 2002 use to 234 gals

Figure 12

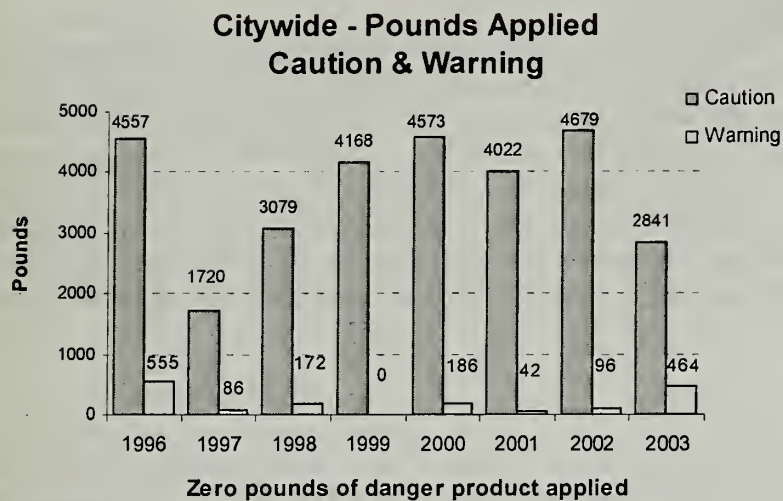
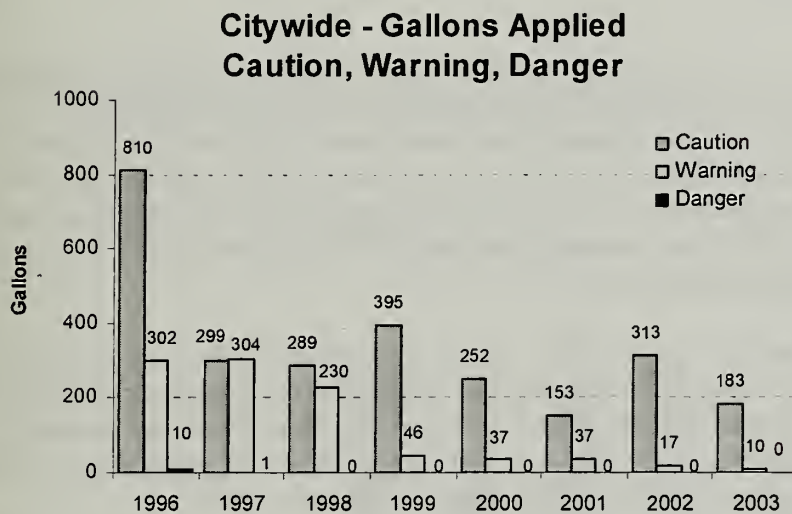


Figure 13



*Caution, Warning, and Danger refer to the signal word placed on the pesticide product label. The signal word reflects a measure of acute toxicity as defined by the Environmental Protection Agency.

Department of Public Health

Trends in Amounts Used:

The Department of Public Health (DPH) exhibits similar trends as other City Departments, but poor records in the early years of the program render those data unreliable (Table 5, Fig. 14). Overall pesticide use remained fairly stable over the last four years (a time of improved record keeping), despite a decrease in numbers of applications. Liquid pesticide products (ie: sprays) have seen a dramatic and consistent decrease from 63 gallons in 1996 to less than one gallon in recent years. The amount of dry formulation pesticides jumped in 1999 and has remained high due to the rat abatement program for the sewers being overseen by DPH, although a decrease of 29% was seen between 2002 and 2003. No use of RoundUp herbicide products were reported in 2003 by DPH (Fig. 16).

Rodenticide Use:

Rodenticides account for 375 pounds of the 391 pounds of pesticides used by DPH in 2003. The most commonly used rodenticide product contains the active ingredient brodifacoum. Because of increasing concerns over secondary poisoning of non-target predatory animals associated with brodifacoum, SFE is working with DPH to reduce or eliminate the use of this product in the future (Fig. 15).

Trends in Toxicity:

The quantity of Tier I products used by DPH has decreased by 36% since 1999 (Fig. 17). Much of the Tier I product was in the form of rodenticides, which have large amounts of inactive, food attractant ingredients causing their total weight to be very heavy compared to the amount of active ingredient used. For example, the 372 pounds of Weatherblok Bait with Bitrex used in 2003 amounts to a total of 0.0186 pounds—or 0.30 ounces—of brodifacoum used, since the percentage of active ingredient is only 0.005%.

A very minor contributor to Tier I use by DPH is ant control products. These products are either contained in bait stations or dispensed in inaccessible areas, presenting very opportunity for exposure. As with rodenticides, ant baits often have low percentages of active ingredients, and additionally are used in small quantities (typically less than an ounce per application). The overall risk of ant baits to humans or nontarget animals is therefore very low.

Tier II products, containing many lower-risk alternatives (most with a Caution label), are on the rise due to increased mosquito control efforts (Fig. 18). Applications of the lowest risk Tier III products—used exclusively for mosquito control—have increased over the past two years (Fig. 19). With DPH's increasing attention toward mosquito management, further increases are expected.

Mosquito Control:

DPH has a cooperative agreement with the California State Department of Health Services for mosquito control throughout San Francisco. With the spread of West Nile Virus to the Bay Area, their responsibilities have increased. In addition to other city departments taking part in mosquito management, DPH is also increasing the use of mosquito larvicides. Documentation of this use has been minimal in the past, and accurate tracking began only this year.

Table 5. Pesticide Products Used by Department of Public Health in 2003			
Product	Hazard Tier	EPA Reg Number	Amnt Used
Altosid briquets	II	2724-375-ZA-64833	9.0156 lbs
Weatherblok bait with bitrex	I	10182-339-AA-10182	372.4875 lbs
Gopher Getter Type 2 bait by Wilco	II	36029-50003-AA-36029	2.75 lbs
Vectolex G Biological mosquito larvicide	III	275-77-AA-275	2.7313 lbs
Maxforce Roach Killer Bait Gel	II	64248-14	2.6294 lbs
Trifluralin (aka Niban bait)	II	64405-2-AA-64405	0.9375 lbs
MAXFORCE ROACH BAIT F.05	II	64248-11	0.4394 lbs
Maxforce IBF4 Carpenter Ant Bait	II	64248-21	0.2013 lbs
TERRO California ant killer	II	149-8-AA-149	0.1125 lbs + 0.4977 gals
Maxforce prof. insect control granules	II	64248-6-ZA-64248	0.0625 lbs
Sun spray ultra-fine spray oil	I	862-23-AA-53219	0.0391 gals
Agnique MMF	III	53263-28	0.0348 gals
Safer insecticidal soap conc.	III	42697-1-ZA-42697	0.0195 gals

Department of Public Health - Pesticide Use Graphs

Figure 14

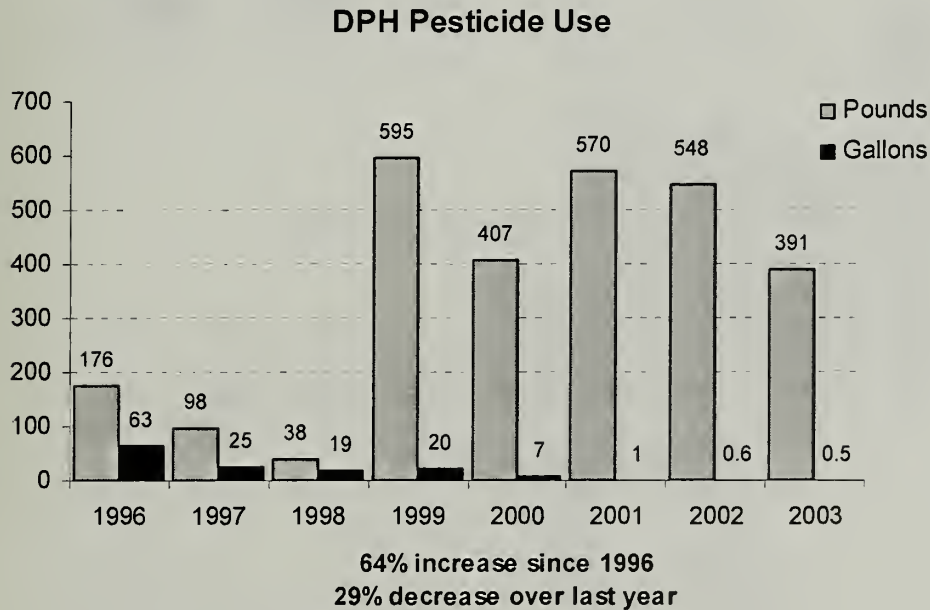


Figure 15

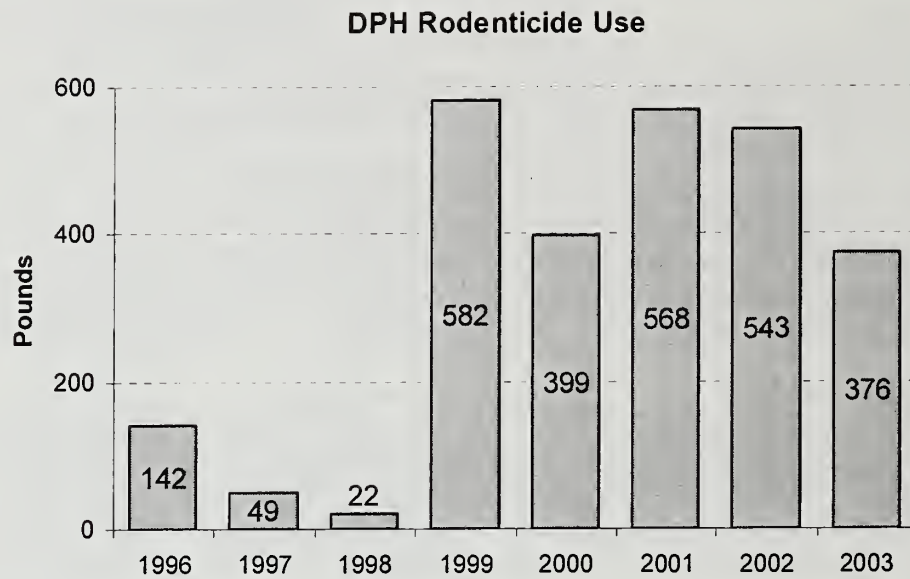


Figure 16

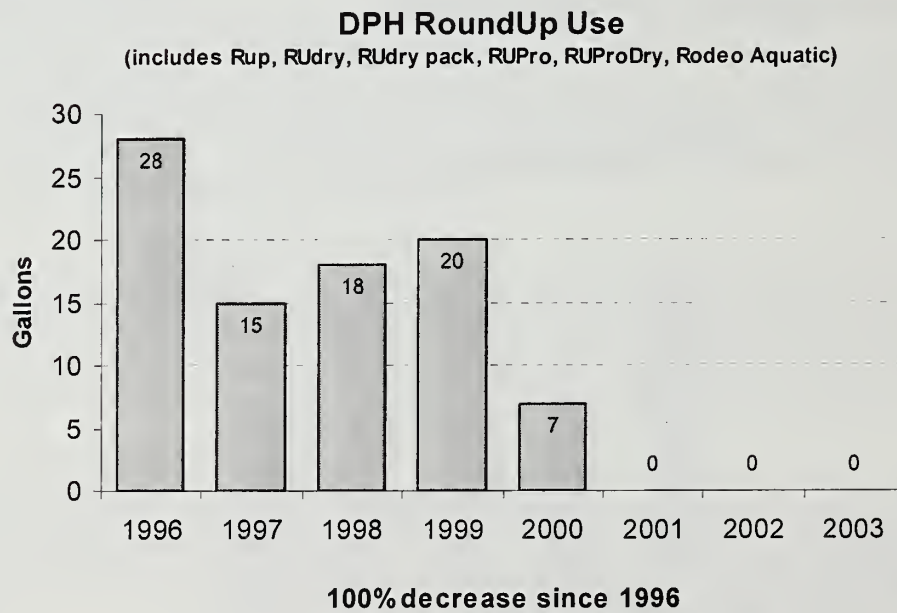


Figure 17

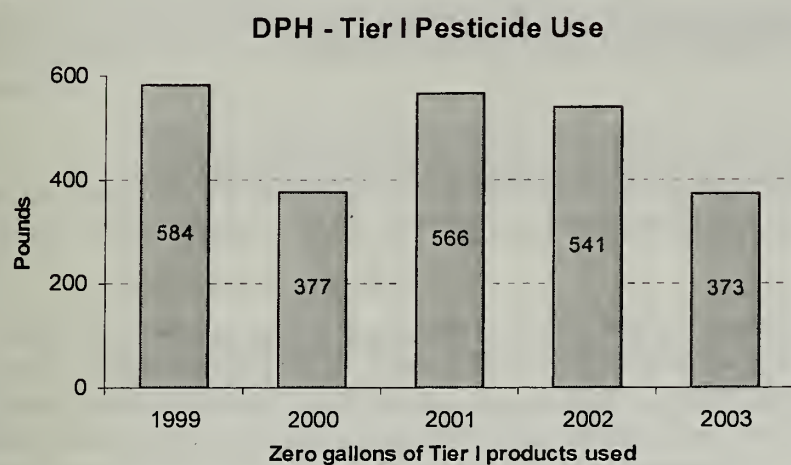


Figure 18

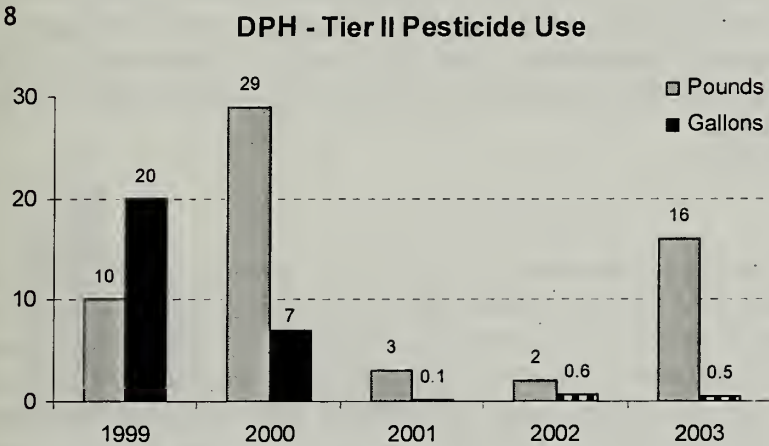
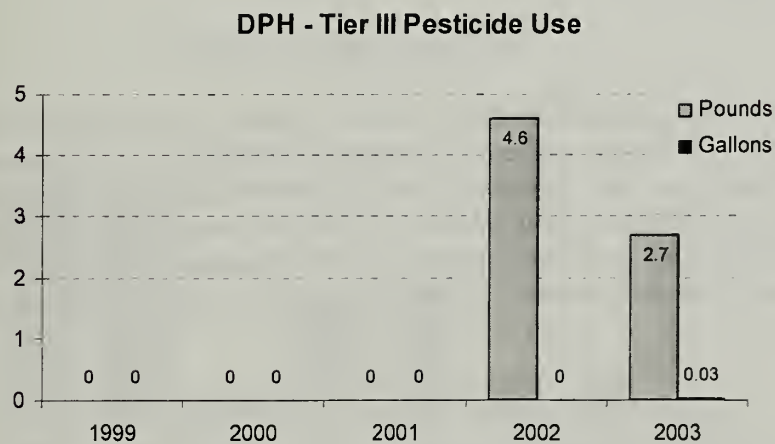


Figure 19



Department of Public Works

Trends in Amounts Used

The Department of Public Works (DPW) is a relatively minor user of pesticides in the City, with only three products used in 2003. Rodenticides account for the majority of product used (Table 6, Fig. 20).

DPW has reorganized its landscaping operations and is reviewing and updating its IPM Plan. SFE and the City IPM Consultant worked with DPW to develop an IPM Demonstration Pilot Project to showcase the use of weed fabric, bark mulch, and xeriscape plants in median strips and sidewalk plantings. Project areas remain healthy, meet meridian vegetation requirements, and continue to need minimal or no maintenance.

SFE has also worked with the DPW Urban Forestry program to achieve its IPM goals. This included the re-introduction of RoundUp use in road median areas with tall weed growth, where hand-weeding or weed-whacking would present a danger to workers. These areas, in order of priority, will be converted to weed cloth and mulch plantings, per the Demonstration Pilot Project, as time and funds allow.

Rodenticide Use

Use of rodenticides for rat control has decreased to less than one pound of product per year—representing a 99.7% decrease since 1996. *Weatherblok Bait with Bitrex* (active ingredient brodifacoum), a Tier I product, was the only product used (Fig. 21). Brodifacoum has serious concerns over secondary toxicity; that is, hazards to non-target predatory animals consuming dead or dying pest species. We are actively working with DPW and other City Departments to reduce or eliminate the use of this product in the future, by employing mass trapping, population monitoring, and sanitation programs. It is important to note that *Weatherblok Bait with Bitrex* contains 0.005% active ingredient, which amounts to 0.000003 ounces of active ingredient brodifacoum used over the past year.

RoundUp Use

DPW, for the fourth year in a row, has eliminated the use of RoundUp and other glyphosate products (Fig. 24). However, weeds are not being controlled adequately in some areas, such as median strips, especially during the Spring months. Lack of personnel has been the major limiting factor, according to DPW staff. DPW gardeners spend the majority of their time on special projects, and have little time available for landscape maintenance. An effort is being made to install weed barrier cloth everywhere possible, to reduce the need for spraying in the future.

Trends in Toxicity:

DPW continues to decrease the use of Tier I products (Fig. 22). All Tier I product use by DPW is for one rat control product (see above for more detail). This product is applied by Pestec, the city pest control contractor.

Use of Tier II products has decreased to almost zero, and no use of Tier III products has been reported (Fig.23). There may be opportunities for DPW to supplement future herbicide use with Tier III products when feasible (ie: not in situations where repeat entries present worker hazards).

Table 6. Products used by Department of Public Works in 2003			
Product	Hazard Tier	EPA Reg Number	Amnt Used
Weatherblok bait with bitrex	I	10182-339-AA-10182	0.875 lbs
Maxforce Roach Killer Bait Gel	II	64248-14	0.0656 lbs
Terro California ant killer	II	149-8-AA-149	0.0469 gals

Department of Public Works - Pesticide Use Graphs

Figure 20

DPW Pesticide Use

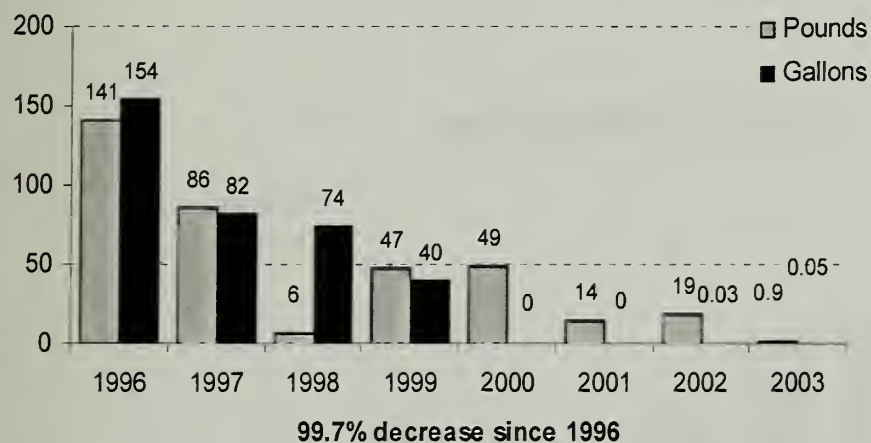


Figure 21

DPW - Rodenticide Use

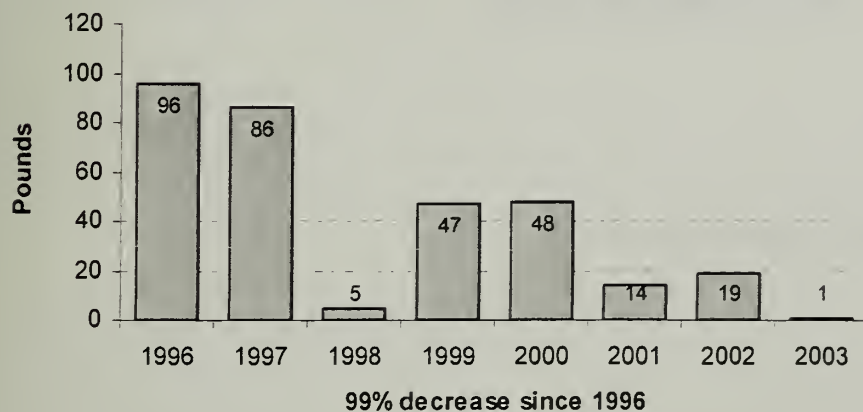


Figure 22

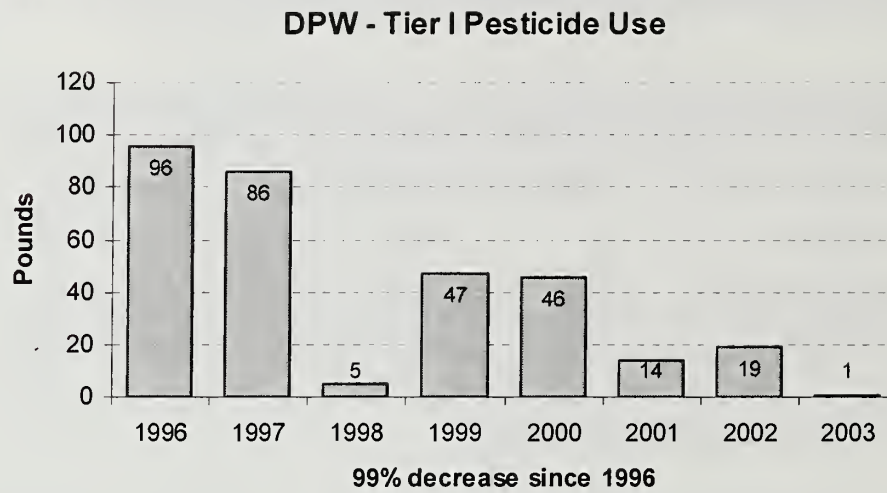
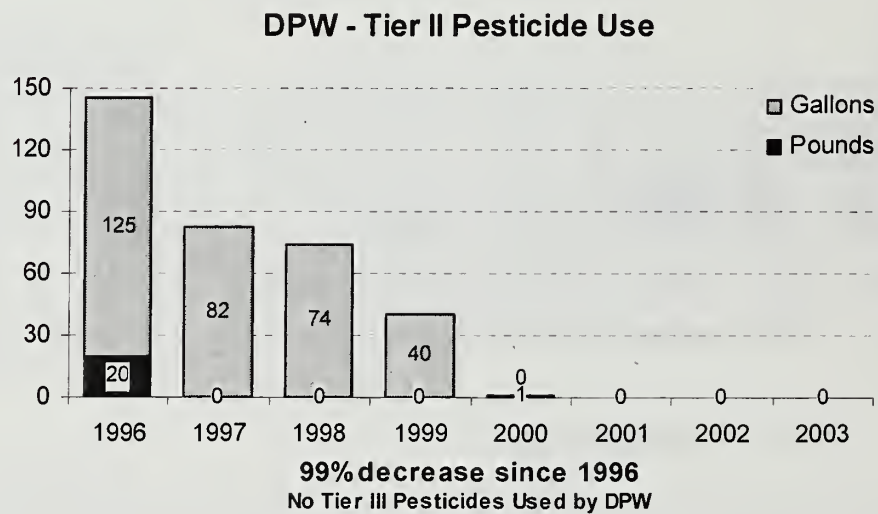
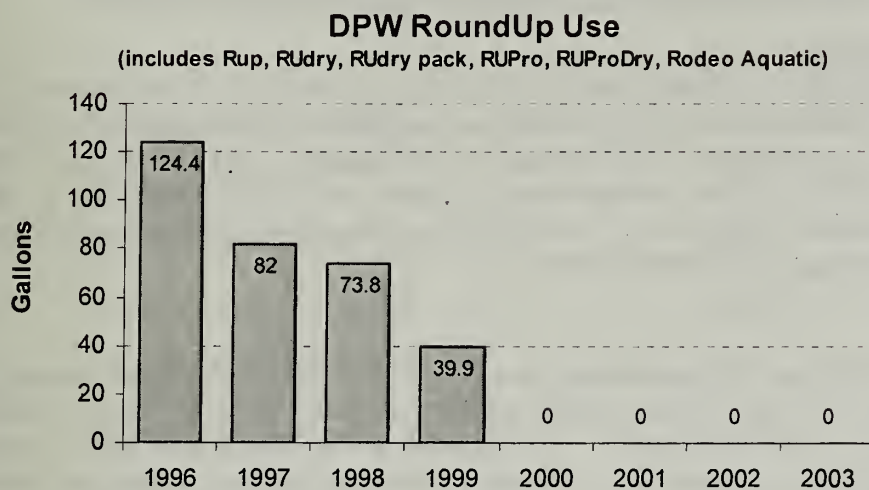


Figure 23



No Use of Tier III Products Reported

Figure 24



Department of Transportation (MUNI)

Trends in Amounts Used

Pesticide use by the Department of Transportation (MUNI) has decreased by approximately 50% since 1996 (Fig. 25). Application of liquid formulations has declined 87%, pointing to MUNI's move away from spray and broadcast applications. Dry formulation use has fluctuated with a decrease from 1997 to 2001 and an increase from 2 pounds in 2001 to 15 pounds in 2003. Accounting for this increase is the use of 13.8 pounds of Weatherblock bait rodenticide in MUNI's increased rat management efforts (Table 7).

Rodenticide Use:

MUNI has increased their use of rodenticides since 1996 in efforts to combat existing rat populations (Fig. 26). The only rodent control product currently used by MUNI contains brodifacoum (*Weatherblok bait with bitrex*). Brodifacoum is a chemical with great concerns over secondary toxicity, that is, hazards to non-target predatory animals consuming dead or dying pest species. The IPM Program will be working with MUNI and other City departments to re-evaluate the use of this active ingredient in the coming year. It is important to note that the overall use of rodenticides by MUNI is very low, only 13.8 pounds in 2003. Combined with the extremely low percentage of active ingredient in the products (0.005%), this amounts to 0.0007 lbs, or 0.011 ounces of brodifacoum used in 2003. Despite the low amount of active ingredient used, due to the toxicity concern with these products, we have been working with the City's pest control contractor (who applies rodenticides for MUNI) to eliminate the use of brodifacoum and expect its use to decrease to zero in 2004.

RoundUp Use:

The use of RoundUp herbicide over the life of the IPM program has plummeted to only 1.7 pounds used in 2002 and 2003, down 85% since 1996 (Fig. 27). Muni reports they are using approximately 1 ounce per application, an indication of minimal amounts of spot spraying and the elimination of broadcast applications. MUNI has increased its tolerance of weeds in some areas, and stepped up the use of weed-whackers in others. However, some areas needed weed control such as on the rail tracks throughout the City are not subject to mechanical controls such as weed-whackers due to the high risk of hitting cars and pedestrians with flying rocks kicked up by the rotating blade. In these areas a spray herbicide is needed for safety considerations, making the total elimination of RoundUp unlikely.

Trends in Toxicity:

The use of the most hazardous products, labeled Tier I, decreased from 1997 to 2001 and is now increasing from 1 pound in 2001 to 14 pounds in 2003 (Fig. 28). *Weatherblock bait with bitrex* accounts for all of the Tier I product use in 2003, and is part of the City's increased focus on rat management. No Tier I liquid formulations are used by MUNI.

Tier II products are in sharp decline, with solid formulations down to less than one pound used each year over the past few years (Fig. 29). Liquid formulations have dropped 83% since 1996 to 2 gallons in 2003.

No tier III products are currently being used by MUNI. We would be currently encouraging MUNI and other Departments to test least-toxic Tier III herbicides.

Table 7. Products Used by MUNI in 2003			
Product	Hazard Tier	EPA Reg Number	Amnt Used
Weatherblok bait with bitrex	I	10182-339-AA-10182	13.8188 lbs
Roundup Pro Herbicide	II	524-475-ZA-524	1.7344 gals
Maxforce Roach Bait F.05	II	64248-11	0.0875 lbs
Maxforce Roach Killer Bait Gel	II	64248-14	0.0744 lbs
Trifluralin (aka Niban bait)	II	64405-2-AA-64405	0.0625 lbs
Maxforce IBF4 Carpenter Ant Bait	II	64248-21	0.0069 lbs
Terro California Ant Killer	II	149-8-AA-149	0.0052 gals

MUNI - Pesticide Use Graphs

Figure 25

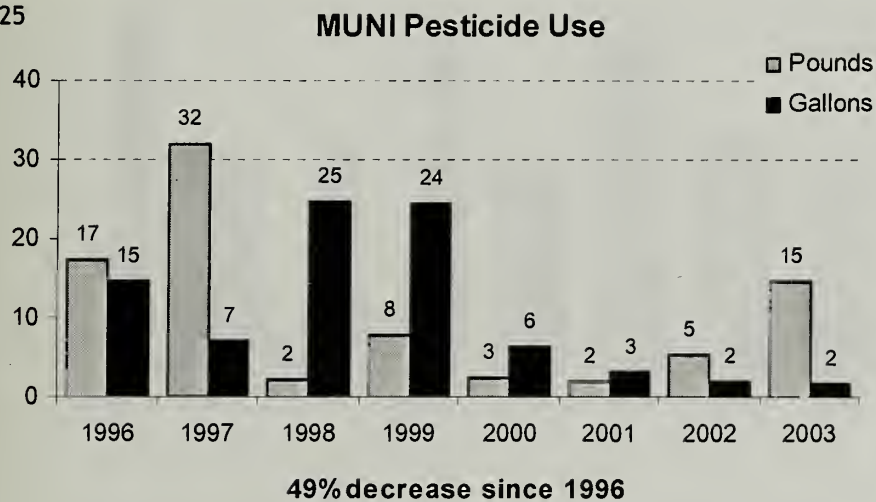


Figure 26

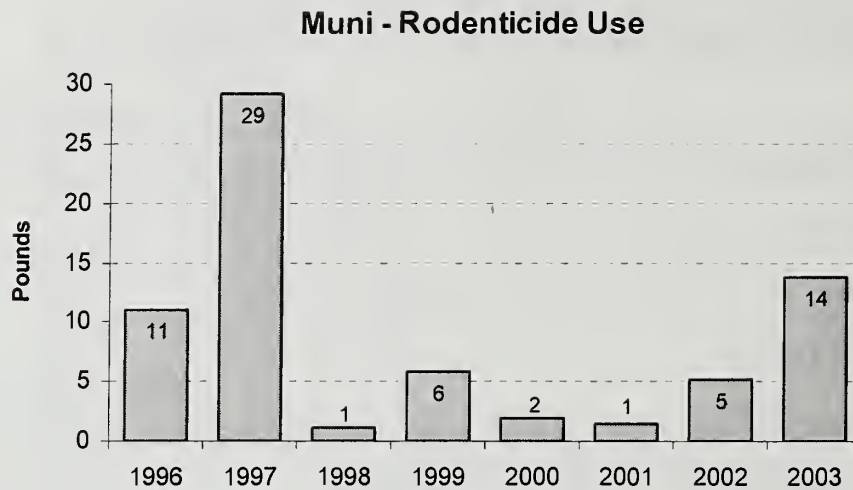
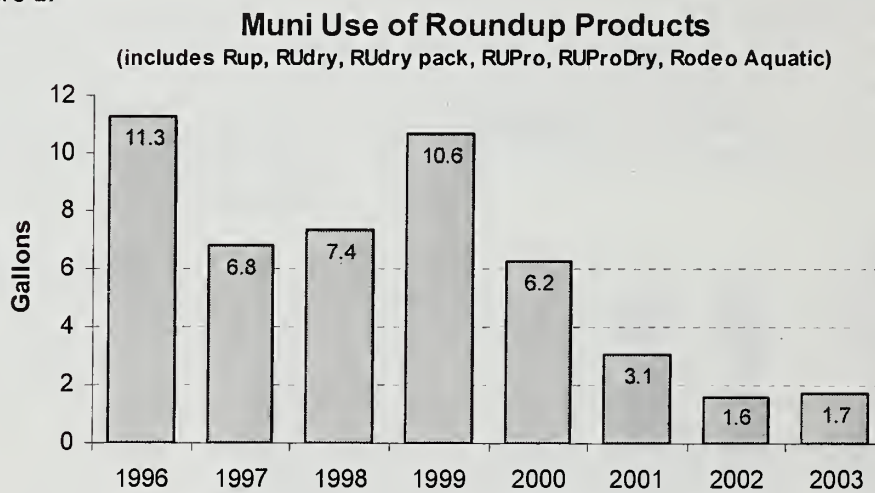


Figure 27



*Between 1996 and 1998 all RoundUp use by MUNI was reported in a single end-of-year report with no information on numbers of applications made.

Figure 28

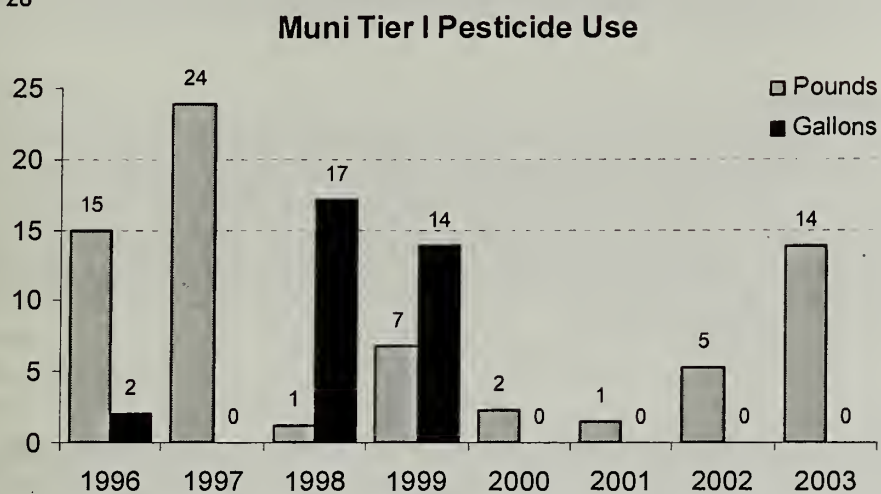
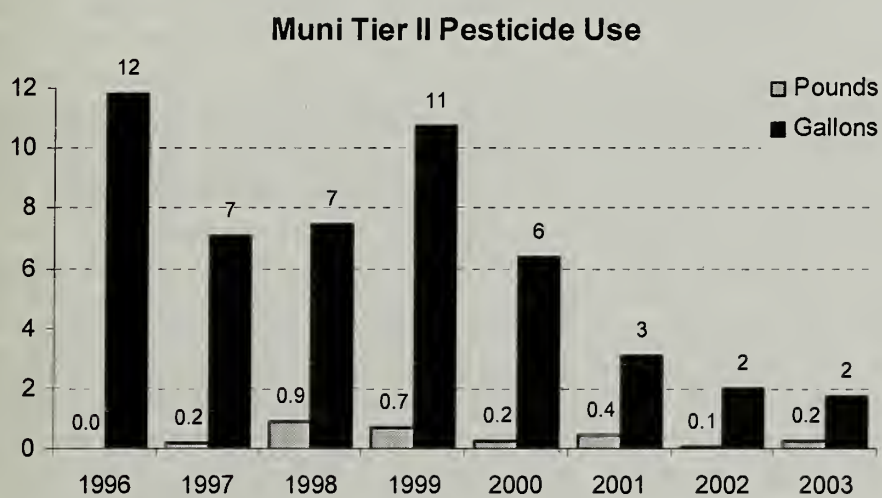


Figure 29



No use of Tier III products reported

Port of San Francisco

Trends in Amounts Used

The total amount of pesticide use by the SF Port Authority (Port) remains stable for dry formulations and has decreased to zero for liquid applications (Table 8, Fig. 30). The Port has focused on increased use of alternative weed control measures such as the use of mulch, mycorrhizal fungi inoculation, drought- and pest- tolerant plantings, mechanical weed removal, and more targeted pesticide applications as evidenced by the elimination of liquid sprays and the movement toward bait use where necessary.

Trends in Toxicity

The use of the most hazardous products defined as Tier I has remained stable since 1999 (Fig. 33). This is due mainly to rodenticide use (see explanation below). The Port continues to use zero liquid formulations of Tier I products.

Tier II pesticide use has decreased 99% to almost zero (0.03 lbs used in 2003), and no Tier III pesticide use has been reported by the Port (Fig. 34). We encourage the Port to look into replacing the Tier II products with those in Tier III whenever possible.

Rodenticide Use

The Port has been actively and consistently managing rodents since 1996, with rodenticides accounting for the majority of pesticide use for all years except 1998 (in 1998 65 lbs of *Spike Dry Flowable* herbicide took the lead) (Fig. 31). Over that period, the use of *Contrac all-weather blocks* (active ingredient bromadiolone, 0.005%) has been supplanted with *Weathblok bait with bitrex* (active ingredient brodifacoum, 0.005%). In 2003, this rodenticide accounted for 99.7% of all pesticide use by the Port. Total use of 65.6 lbs of *Weathblok bait with bitrex* amounted to 0.0033 lbs, or 0.0525 ounces of total active ingredient used over the year. Brodifacoum is a chemical with concerns over secondary toxicity, that is, hazards to non-target predatory animals consuming dead or dying pest species. To minimize secondary toxicity hazards, all rodenticide use on Port property, applied exclusively by the Citywide pest control contractor Pestec, is carefully placed out of the way of non-target organisms in bait boxes. In addition, Pestec is increasing the use of snap traps on Port property as an alternative to rodenticides. Nonetheless, the increasing concern with brodifacoum has led the IPM Program to work with the Port and other City Departments to minimize or eliminate the use of products containing this ingredient. In response to this concern, 2004 use of products containing brodifacoum is expected to be greatly reduced or zero.

RoundUp Use

The use of RoundUp at the Port is reported at zero for the third year in a row (Fig. 32). Port gardening staff use various methods to prevent pest problems before they occur, and continually use least toxic methods when pest control action is needed. Port gardening staff applied for and received a toxics reduction grant in 2003 to purchase a wood chipper. The chipper has been used to generate large amounts of wood chip mulch, used for weed control, soil health improvement, landscape aesthetics, and stormwater runoff prevention. The use of native and drought tolerant plants has further decreased the need for pest control or chemical use. An additional benefit of

using wood mulch is its gradual decomposition over time, adding nutrients to the soil – not only does this increase plant resilience, it reduces or eliminates the need for chemical fertilizers.

IPM Efforts

The Port conducted a study to test the effects of mycorrhizal fungi inoculation on native landscape plantings. These beneficial fungi are known for being essential to the survival of some plants and for increasing the health of others. The goal of purchasing these products is to increase plant health and thereby decrease the need for fertilizers and pest control efforts. A set of new native plantings in Rincon Park was inoculated with mycorrhizal fungi in February 2003. Over a 6-month test period two test plots and two control plots were monitored for plant vitality and health via visual inspection and photo documentation. Visible differences were found between plants in the test and control plots, with *Manzanita* and *Salvia* plants showing the greatest benefit from inoculation in terms of plant appearance. Eight months after the start of the project the control plot began to show the same positive results as the test plot; because mycorrhizal fungi are known to spread to adjacent areas it is possible they eventually colonized the control plot, causing the recorded increase in plant health upon establishment. Soil testing as a component of this study was cost prohibitive. Carolyn Adams, a Port gardener, presented the findings of the study at the annual IPM Conference in January 2004.

In addition to investigating methods of increasing plant health, the Port uses several mechanical methods for weed control including using weed whackers, weed torches, mowers, black tarping, wood chips, and weed hoes. Port gardening staff applied for and received a grant to purchase a wood chipper to improve landscape aesthetics, improve soil health at many sites, and solve a solid waste problem. The gardening staff's involvement with the IPM technical advisory committee also connected them to the USDA soils group who will be working with them in the future to identify soil deficiencies and remedies.

Challenges

The Port gardening department has only two gardeners who tend to all landscaped Port property. This at times leaves inadequate time for maintenance of existing projects, leading to weed establishment in neglected areas. Areas such as 24th Street Park (Warm Water Cove), Islas Creek Park, and several right-of-way areas continue to have high levels of weed growth. Herons Head Park is one site where adequate attention has produced a model landscape. This restoration site has 300 new toyon trees (*Heteromeles arbutifolia*), a drought and pest tolerant California native. Tree wells and planting beds are adequately mulched, and the use of propane torches for weed control is planned for the near future.

A few areas have been identified where the Port could increase the productivity of its limited gardening staff time. Automated sprinkler systems would eliminate the need for frequent staff attention. Additionally, staff access to existing Port tools and equipment, such as propane for weed torches, bobcats for large digging projects, and a water truck for new plantings, would increase the efficiency of staff efforts. For increasing landscape maintenance efficacy, it is also important that the materials and soil amendments ordered are delivered in a timely manner.

Table 8. Pesticide Products used by the Port of SF in 2003			
Product	Hazard Tier	EPA Reg Number	Amnt Used
Weatherblock bait with bitrex	I	10182-339-AA-10182	65.6319 lbs
Trifluralin (aka Niban bait)	II	64405-2-AA-64405	0.0625 lbs
Terro California Ant Killer	II	149-8-AA-149	0.0342 gals
Maxforce Ant Bait F1	II	64248-10-AA-64248	0.0313 lbs

Port of San Francisco - Pesticide Use Graphs

Figure 30

Port Pesticide Use

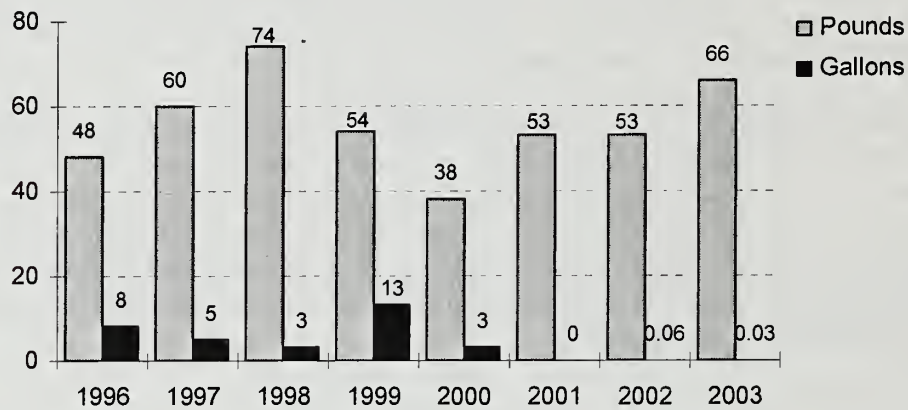


Figure 31

Port Rodenticide Use

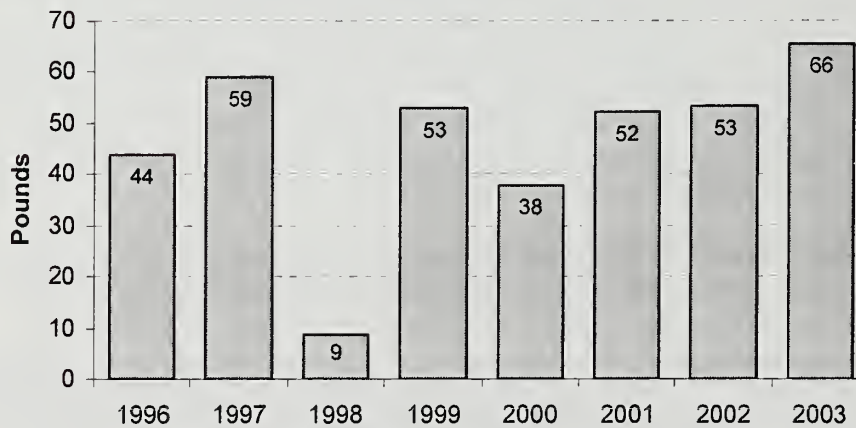
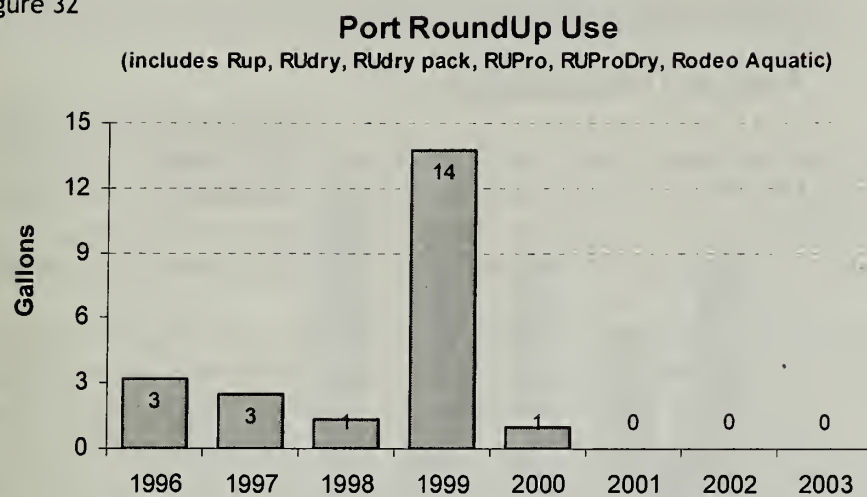


Figure 32



Zero pounds of RoundUp/Glyphosate use reported

Figure 33

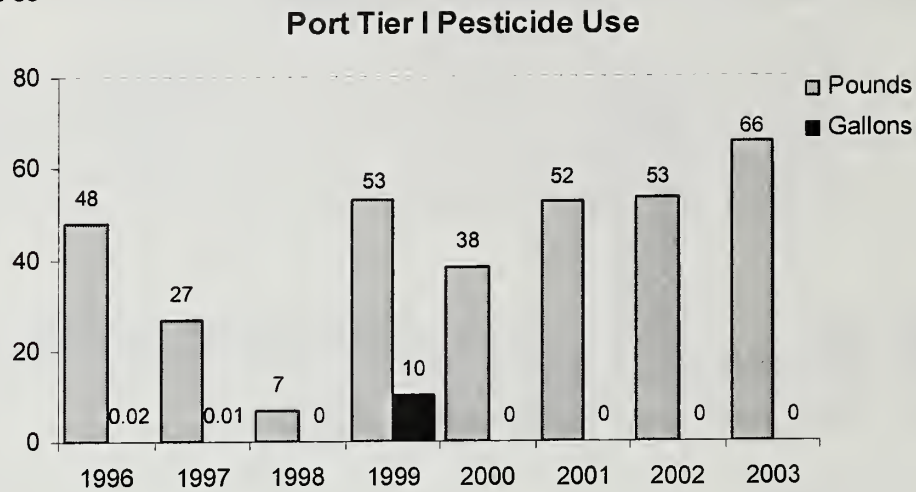
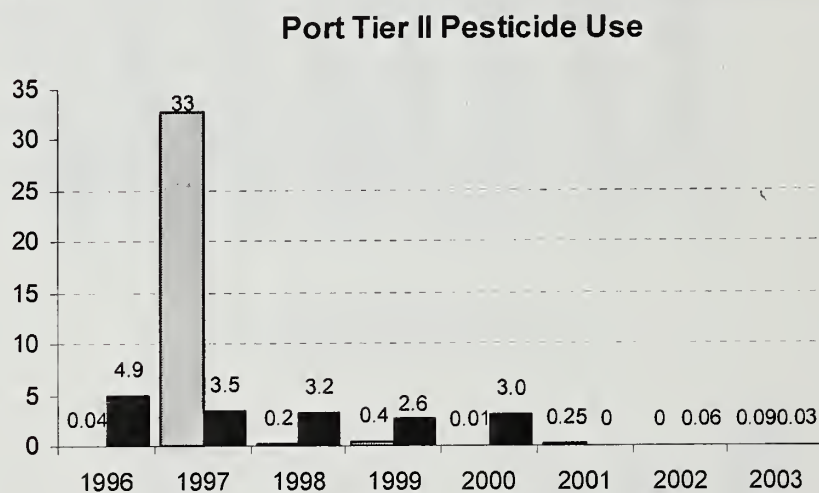


Figure 34



No use of Tier III products reported

Public Utilities Commission

Trends in Amounts Used

The Public Utilities Commission (PUC) is the second largest pesticide user among City departments. Since the beginning of the IPM Program in 1996, PUC has dramatically reduced its total pesticide use both in pounds (92% reduction) and gallons (97% reduction) (Fig. 35). The reduction in pounds/gallons used has leveled off during the past four years.

The kinds of pesticides used have also changed: In poundage, herbicides have decreased steadily, rodenticides have fluctuated after the first-year reduction, and mosquito control products dropped initially but then increased in the past two years, probably due to West Nile virus concerns (Table 9). Overall, PUC is clearly using fewer and safer pesticides than in the past. This trend reflects the many creative non-chemical approaches employed by PUC staff from manual control of pampas grass, habitat modification to discourage pests, and the use of goats instead of herbicides for weed control.

Rodenticide Use

Rodenticide use has fluctuated since an initial drop in 1997, but has increased steadily for the past three years (Fig. 41). About half of the rodenticides were used to control pocket gophers at the Sunol corporation yard and turf areas. The remainder was used by the City's pest control contractor for rat control at three PUC-Water Dept. facilities. In general, the increase in rat baiting has corresponded to an increased Citywide effort to control rats, not from any measured increase in rat populations.

Mosquito Control

Mosquito larvicides again accounted for the majority of PUC pesticide use, when measured in pounds of product: 42 lbs. out of a 81 lbs. total (Fig. 36). This usage represents a significant drop from 2002, when about 77 pounds of larvicide was applied. The larvicides used by the PUC fit the requirements of an IPM program. They are some of the least toxic, yet most effective products available, and they target mosquitoes at their most vulnerable stage. Much of the PUC mosquito abatement and control work focuses on eliminating breeding habitat (standing water), or applying larvicides when necessary.

RoundUp Use:

Roundup use dropped by 99% since the beginning of the IPM program in 1996, and has leveled off at very low levels for the past three years (Fig. 37). Lack of staffing resources accounted for part of the reductions, forcing the use of herbicides on an as-needed and time-available basis. The PUC currently limits herbicide applications to problem weed areas and sidewalks. Additionally, PUC has been using more mechanical weed management methods such as mowing, weed whacking, and goat grazing. In cases where herbicide is used, the area is most often mechanically weeded beforehand, then RoundUp is used sparingly on emerging vegetation one week later. This targeting of the most susceptible stage of plant growth has helped the PUC to drastically reduce chemical use.

Trends in Toxicity

The use of the most hazardous products defined as Tier I rose from 8 to 16 lbs. between 2002 and 2003 (Fig. 38). *Weatherblok Bait with Bitrex®* (active ingredient brodifacoum), a rodenticide use to control rats, accounted for 15 of the 16 pounds. The other Tier I product used was *Transline* (active ingredient clopyralid) – an herbicide commonly applied to control the invasive weed yellow star thistle. Clopyralid has low acute toxicity but has aroused concern over its persistence in compost.

Tier III products – the lowest hazard category of pesticides – decreased somewhat in 2003, due to a reduction in the use of microbial mosquito control products (*VectolexG*) (Fig. 40). Tier II products, the middle category, remained roughly equal (Fig. 39).

Table 9. SF PUC pesticide products used in 2003			
Product	Hazard Tier	EPA Reg Number	Amnt Used
Agnique MMF	II	53263-28	7.19 gals
Vectolex G biological mosquito larvicide	III	275-77-AA-275	34.7556 lbs
Roundup Pro herbicide	II	524-475-ZA-524	3.0859 gals
Eaton's answer for the control of pocket gophers	II	56-57-AA-56	20 lbs
Advance liquid ant bait	III	56-72-AA-499	2.5 lbs
Weatherblok bait with bitrex	I	10182-339-AA-10182	14.975 lbs
Maxforce professional insect control granules	I	64248-6-ZA-64248	0.9688 lbs
Trifluralin (aka Niban bait)	II	64405-2-AA-64405	0.75 lbs
Rodeo aquatic herbicide	II	524-343-AA-524	0.3906 gals
Terro California ant killer	II	149-8-AA-149	0.3141 gals
PT 515 Wasp-freeze	II	499-362-AA-499	0.2969 gals
Turflon ester	II	62719-258-AA-62719	0.2734 gals
Maxforce IBF4 Carpenter Ant Bait	II	64248-21	0.0656 lbs
Garlon 4	II	62719-40-ZB-62719	0.0625 gals
EZJect selective injection herbicide caps	II	524-435-AA-524	0.0273 gals
Transline (exemption – not approved)	I	62719-259-AA-62719	0.0117 gals

Public Utilities Commission - Pesticide Use Graphs

Figure 35

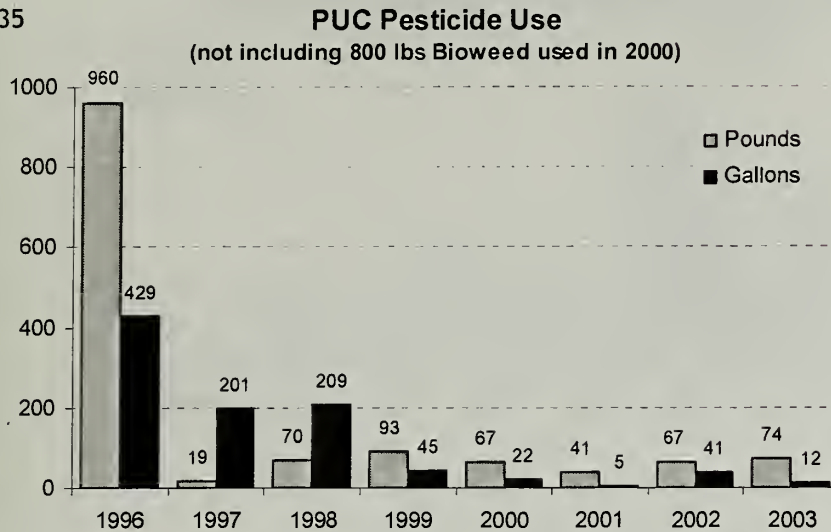


Figure 36

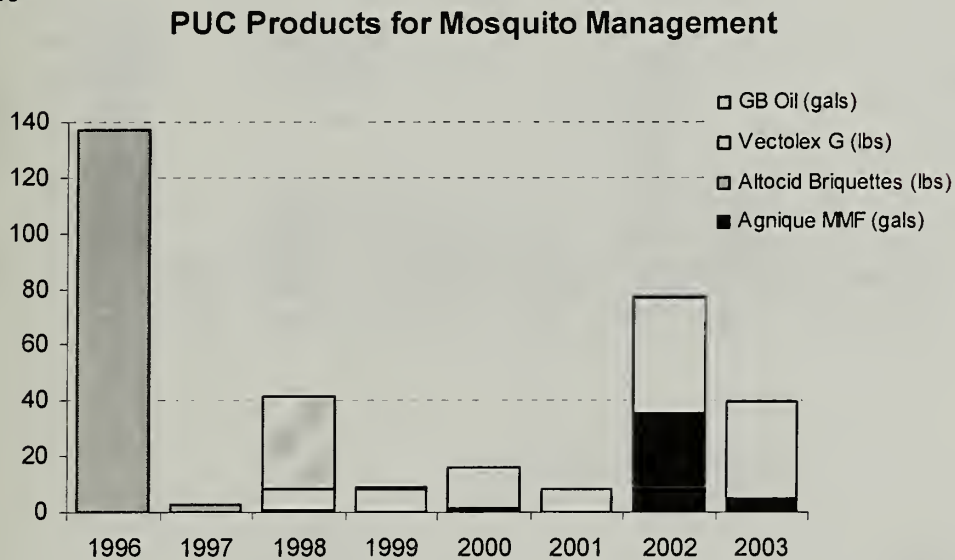


Figure 37

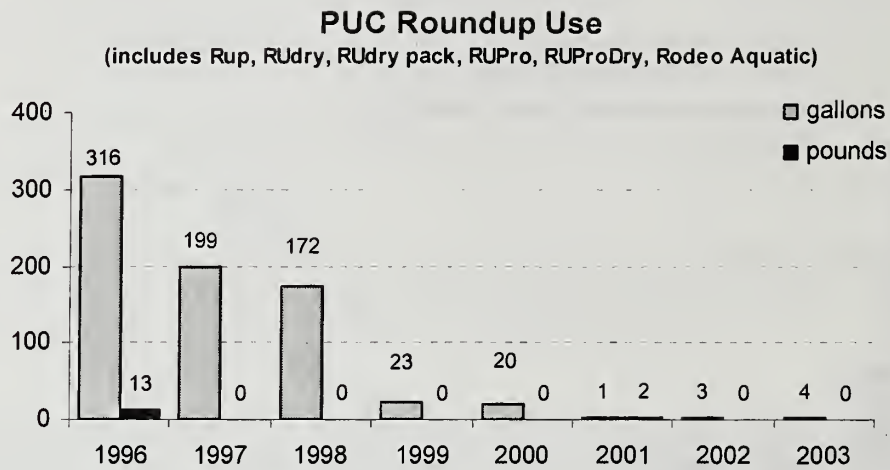


Figure 38

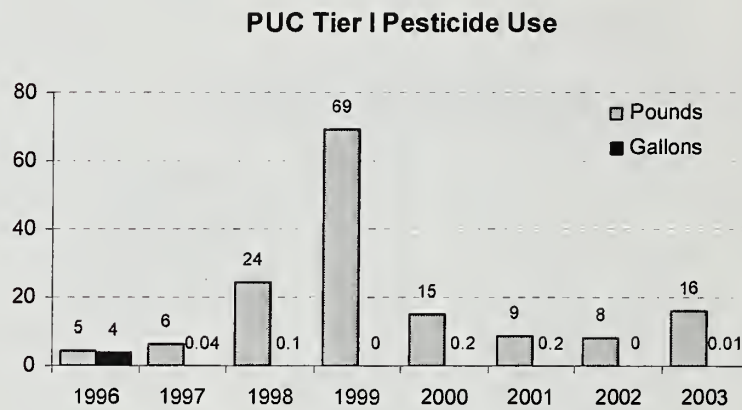


Figure 39

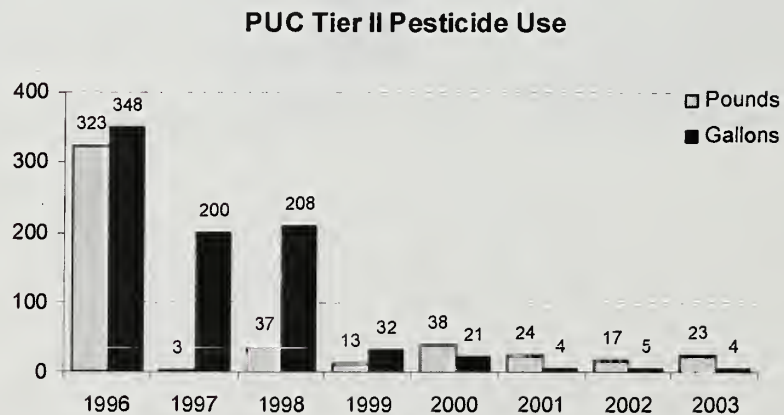


Figure 40 (excludes Bioweed and Suppressa use)

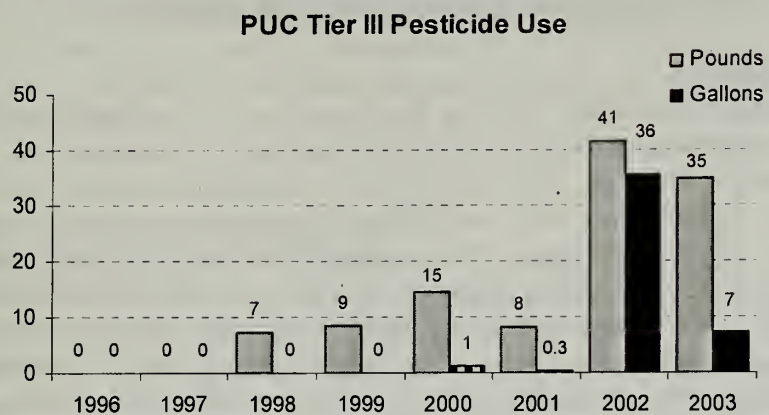
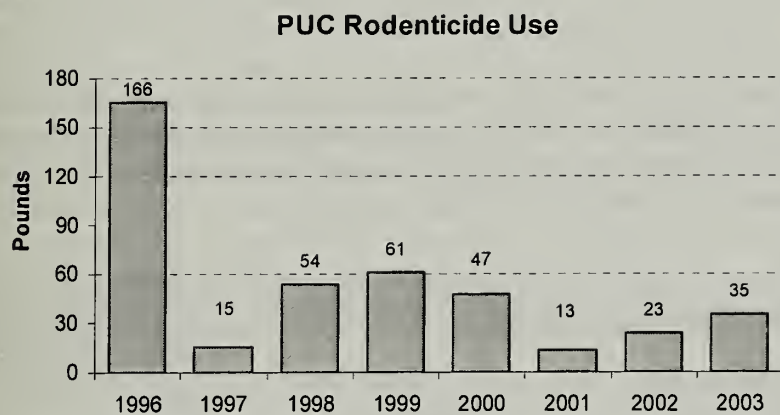


Figure 41



Department of Recreation and Parks

Trends in Amounts Used

The Department of Recreation and Parks (R&P) is the biggest user of chemical pesticides in San Francisco because this department manages the largest acreage of landscaped area. There is considerable IPM expertise within the ranks of R&P: The department currently has three staff licensed as Agricultural Pest Control Advisors (PCAs), and numerous staff with Qualified Applicator Certificates. This professionalism is reflected in both the innovative projects undertaken by R&P and by the decreasing trend in pesticide use. It is important to remove Supressa and Bioweed from these analyses because these nontoxic products were applied by the ton, thus skewing other pesticide use statistics (Fig. 42). If pesticide use is examined without looking at Supressa/Bioweed products, R&P overall pesticide use (dry formulations, excluding rodenticides) has decreased by 70% since 1996 (Fig. 43). However, when rodenticides are included the use patterns remain consistent with only a 28% decrease since 1996 in dry formulations. This is due to mainly to the increased use of rodenticides over the past several years (Fig. 44), as well as to the high standards to which the municipal Harding Park Golf Course is being held.

Rodenticide Use

Rodenticide use has increased 152% since 1996, but decreased 31% between 2002 and 2003 (Fig. 44). The high quantity of rodenticide use is due not to elevated pest pressure, but rather to a more concerted effort to tackle rodent problems in park areas around the City. The rodenticide products used by R&P, in order of quantity used in 2003 are as follows:

Table 10. Department of Rec&Parks 2003 rodenticide use					
Product Name	EPA Number	Pest	Active Ing %	Lbs/ozs Product	Lbs Act Ing
Ditrac super-size blox	12455-14-ZA-12455	Rats/mice	Diphacinone 0.005%	496.75 lbs	0.0248 lbs
Eaton's all-weather bait blocks rodenticide	56-42-AA-56	Rats/mice	Diphacinone 0.005%	415.63 lbs	0.0208 lbs
Eaton's answer for the control of pocket gophers	56-57-AA-56	Gophers	Diphacinone 0.005%	355.13 lbs	0.0178 lbs
Maki mini-block	7173-202-AA-7173	Rats/mice	Bromadiolone 0.005%	284.63 lbs	0.0142 lbs
Generation mini blocks	7173-218-AA-7173	Rats/mice	Difethialone 0.0025%	95.06 lbs	0.0024 lbs
JB Eaton Top Gun All Weather BaitBlock Rodenticide	67517-66-56	Rats	Bromethalin 0.01%	32.13 lbs	0.0031 lbs
Eaton's all weather bait blocks rodenticide	56-42-AA-56	Rats	Diphacinone 0.005%	6.25 lbs	0.0003 lbs
Eaton's bait blocks rodenticide with bitrex	56-44-ZA-56	Rats	Diphacinone 0.005%	1.63 lbs	0.0001lbs
Weatherblok bait with bitrex	10182-339-AA-10182	Rats	Brodifacoum 0.005%	1.09 lbs	0.0001 lbs

R&P has made a concerted effort to reduce the amount of products containing the active ingredient brodifacoum due to serious concerns over secondary toxicity, that is, hazards to non-target predatory animals consuming dead or dying pest species. In fact, it is currently the most

infrequently used rodenticide by R&P (Table 10). It is important to note that because the formulations contain such a small percent of active ingredient, actual amount of brodifacoum used is very low. In 2003, 1.09 lbs of Weatherblok bait with bitrex was used; with an active ingredient percentage of 0.005%, this amounts to only 0.0001 lbs or 0.0016 ounces of brodifacoum. R&P plans to completely eliminate the use of rodenticides containing brodifacoum in 2004.

RoundUp and Other Herbicide Use:

R&P showed 16 gallons and 203 pounds of *RoundUp* used in 2003, a 92% decrease in liquid formulations and a 306% increase in dry formulations over 2002 (Fig.45). R&P has been moving away from the use of the liquid *RoundUp* products due to concerns with the inert ingredients. Additionally, the dry granular formulation is easier to pour and has less change of spill, does not leave residue on the outside of containers, is in dry granular form and is therefore easier to clean up in the case of a spill. According to Monsanto (the product's manufacturer), the inert ingredients in the dry formulation have fewer toxicity concerns.

In 2002 the Harding Park Golf course renovation employed the use of 140 gallons of *RoundUp* herbicide to kill all the existing kikuyu grass before re-planting with more desirable grasses. The course remains free of kikuyu, with new patches being spot treated or removed by hand when detected. The course renovation project was justified and funded in part by the ability to hold PGA tournaments at the site after the renovation. This necessitates the continued maintenance of very low weed levels and high aesthetic standards. Although post-renovation kikuyu remains under control, several new weeds have invaded, including *Soliva sessilis* (field soliva) and Swine cress (*Coronopus* sp.). Much of the non-*RoundUp* herbicide use in 2003 (*Vanquish*, *Turflon ester*, and *Proturf new KOG Weed Control*) is to mediate the invasion of these weeds and satisfy the PGA tournament standards.

Trends in Toxicity

R&P use of Tier I products, those with the highest toxicity concerns, has fluctuated over the years (Fig. 46) with an overall decreasing trend. In 2003 the total quantity of Tier I products showed an increase of 95% over the start of the IPM program in 1996. However, since the Hazard Tier rating system was implemented in 1999 and these products were identified as high hazard, R&P's use of Tier I products has decreased by 40% and the use of liquid Tier I products has been phased out. The 206% increase from 416 lbs in 2002 to 804 lbs in 2003 was due mainly to increased use of two products:

<u>Pesticide Used</u>	<u>2002</u>	<u>2003</u>
Maki mini blocks rodenticide	28 lbs	285 lbs
Proturf New KOG herbicide	95 lbs	369 lbs

The use of Proturf New KOG Weed Control has increased sharply over the past few years as it has replaced the more toxic Vanquish herbicide (Fig. 8). It is used only on high maintenance turf (golf greens, bowling greens, and croquet greens) with heavy pressure from invasive weeds. These weeds are often hand-weeded, but occasionally need to be treated with an herbicide. Although Proturf New KOG Weed Control and Vanquish are both Tier I products, Vanquish (decreased to 33 gallons used in 2003) contains 54% active ingredient whereas its replacement contains only 0.7% active ingredient. R&P has also been substituting the Tier II product Turflon

Ester for Vanquish (Tier I), in a further effort to reduce overall risks. However, Vanquish is still being used for certain problematic or herbicide-resistant weeds in high profile turf.

The top five most widely used Tier I products are:

Herbicide:	<i>Proturf new KOG weed control</i>
Rodenticide:	<i>Maki Mini Blocks</i>
Fungicide:	<i>Proturf systemic fungicide</i>
Herbicide:	<i>Vanquish herbicide</i>
Fungicide:	<i>3336 WP fungicide</i>

It is encouraging to see the use of these products declining over time, with *PT brand 175 microcare* being reduced to 0.58 gallons of use in 2003 (Table II). Fungicide use by R&P on golf courses is also steeply declining and may be the result of their increased use of EM1, a microbial product, and compost tea applications on golf greens. R&P has eliminated the use of *Durham metaldehyde granules* to zero and is now using iron phosphate instead (Sluggo)—a Tier III product.

The use of Tier II products rose from 1999 to 2002 as the direct result of substituting Tier I products with the less toxic ones in Tier II (such as *Vanquish* being phased out and replaced by *Turflon Ester*, above) (Fig. 47). However, R&P's use of Tier II products decreased 38% between 2002 and 2003.

The use of Tier III products by R&P has increased since 1999 (Fig. 48). This reflects the increasing trial and use of least-toxic products in this Tier as a replacement for more toxic Tier I and Tier 2 products. Recreation and Parks staff are active participants in the process of seeking and testing less toxic alternatives; as such, we expect the use of Tier 3 products to increase over time.

Other Notes

It is important to note that the R&P has demonstrated a commitment to the IPM program that may not be wholly reflected in the data included in this report. Activities such as training for staff, pilot projects experimenting with compost tea and EM-1 products, trial use of non-toxic rodenticides, increased use of mechanical weed removal and weed tolerance at Sharp Park and Lincoln golf courses, increased use propane-powered weed torches, extensive use of mulch to prevent weeds, use of beneficial insects, and manual removal efforts for aquatic weeds all indicate R&P's willingness to seek alternatives to chemical pesticides. Use of weed barriers such as weed fabric or cardboard covered by mulch is increasing and turning many landscaped areas into low maintenance sites. At Harding Park golf course a large-scale weed hand-removal program is being planned where a group of workers will come in for several days and dedicate their time to physical removal of english daisies and other problem weeds. R&P's use of "weed daubers" to target herbicide applications helps them reduce pesticide use and exposure while curbing the spread of invasive species. R&P is also stepping up their composting program with financial planning to purchase equipment necessary to process high quality compost. For mosquito control, R&P staff have drained several water sources, use *Bacillus thuringiensis* bacterial products to manage larval mosquitoes, and have introduced mosquito fish (*Gambusia affinis*) to contained ponds.

Table 11. Pesticide Products Used by the Dept. of Recreation and Parks, 2003

Product	Tier	EPA Number	Amount	Unit
DITRAC SUPER-SIZE BLOX	II	12455-14-ZA-12455	496.750	lbs
EATON'S ALL-WEATHER BAIT BLOCKS RODENTIC	II	56-42-AA-56	415.625	lbs
PROTURF NEW K-O-G WEED CONTROL	I	538-112-AA-538	368.500	lbs
EATON'S ANSWER FOR THE CONTROL OF POCKET	II	56-57-AA-56	355.125	lbs
MAKI MINI-BLOCK	I	7173-202-AA-7173	284.625	lbs
ROUNDUP PRO DRY	II	524-505	203.572	lbs
PROTURF SYSTEM SYSTEMIC FUNGICIDE BY SCOTT'S	I	538-88-ZA-538	112.500	lbs
GENERATION MINI BLOCKS	IV	7173-218-AA-7173	95.063	lbs
NEU 1165M SLUG AND SNAIL BAIT (AKA SLUGGO)	III	67702-3-AA-67702	82.250	lbs
VECTOBAC-G BIOLOGICAL MOSQUITO LARVICIDE	III	275-50-AA-275	57.000	lbs
AQUASHADE	III	33068-1-AA-33068	36.000	gals
MARATHON 1% GRANULAR GREENHOUSE AND NURS	I	3125-452-AA-59807	33.494	lbs
VANQUISH HERBICIDE	I	55947-46-AA-55947	32.875	gals
JB EATON TOP GUN ALL WEATHER BAITBLOCK RODENTICIDE	II	67517-66-56	30.563	lbs
ROUNDUP PRO HERBICIDE	II	524-475-ZA-524	15.239	gals
TURFLON ESTER	II	62719-258-AA-62719	11.856	gals
PT 515 WASP-FREEZE WASP AND HORNET	II	499-362-AA-499	9.160	gals
TRIFLURALIN	II	64405-2-AA-64405	9.063	lbs
M-PEDE INSECTICIDE	II	53219-6-AA-53219	6.270	gals
EATON'S ALL-WEATHER BAIT BLOCKS RODENTIC	II	56-42-AA-56	6.250	lbs
GARLON 4	II	62719-40-ZB-62719	4.893	gals
3336 WP TURF AND ORNAMENTAL FUNGICIDE IN	I	1001-63-AA-1001	4.000	lbs
KALIGREEN	III	70231-1-AA-70231	2.250	lbs
EATON'S BAIT BLOCKS RODENTICIDE WITH BIT	II	56-44-ZA-56	1.625	lbs
JB EATON TOP GUN ALL WEATHER BAITBLOCK RODENTICIDE	II	67517-66-56	1.563	lbs
JMS STYLET-OIL	II	65564-1-AA-65564	1.359	gals
HERITAGE FUNGICIDE	I	10182-408-AA-10182	1.313	lbs
BOTANIGARD ES	III	65626-8-ZA-65626	1.186	gals
3336 WP TURF AND ORNAMENTAL FUNGICIDE IN	I	1001-63-AA-1001	1.109	lbs
WEATHERBLOK BAIT WITH BITREX (MADE WITH	I	10182-339-AA-10182	1.094	lbs
SUN SPRAY ULTRA-FINE SPRAY OIL	I	862-23-AA-53219	0.849	gals
PT BRAND 175 MICRO CARE	I	499-381-AA-499	0.551	gals
ROOTONE F BRAND ROOTING HORMONE	I	264-499-AA-264	0.500	lbs
MOSQUITO DUNKS	III	6218-47-ZB-6218	0.433	lbs
MAXFORCE ROACH CONTROL SYSTEM	I	64248-1-AA-64248	0.429	lbs
JAVELIN WG	III	70051-66-AA-70051	0.406	lbs
ENSTAR II INSECT GROWTH REGULATOR	III	55947-82-ZA-55947	0.400	gals
NEU 1165M SLUG AND SNAIL BAIT (AKA SLUGGO)	III	67702-3-AA-67702	0.375	lbs
RODEO AQUATIC HERBICIDE	II	524-343-AA-524	0.320	gals
PRESCRIPTION TREATMENT BRAND MICRO CARE P	I	499-381-ZA-499	0.297	gals
ROUNDUP PRO DRY	II	524-505	0.281	lbs
AVID 0.15 EC	II	618-96-AA-618	0.277	gals
SONAR A.S.	II	67690-4-AA-67690	0.250	gals
CONSERVE SC TURF AND ORNAMENTAL	I	62719-291-AA-62719	0.214	gals
ROACHX	II	71761-1-AA	0.191	gals
FLUORGUARD ANT CONTROL BAITS	III	1812-348-AA-279	0.179	lbs
UNCLE ALBERT'S ANT BAIT	II	73340-1	0.176	gals
EZJECT SELECTIVE INJECTION HERBICIDE CAP	II	524-435-AA-524	0.114	lbs
MAXFORCE ROACH KILLER BAIT GEL	II	64248-14	0.066	gals
MAXFORCE ANT BAIT F1	II	64248-10-AA-64248	0.066	gals

Table 11. Pesticide Products Used by the Dept. of Recreation and Parks, 2003				
Product	Tier	EPA Number	Amount	Unit
PENDULUM WDG HERBICIDE	II	241-340-AA-241	0.063	lbs
TERRO CALIFORNIA ANT KILLER	II	149-8-AA-149	0.062	gals
AZATIN XL	II	70051-27-59807	0.059	gals
MOSQUITO DUNKS	III	6218-47-ZB-6218	0.058	lbs
ORANGE GUARD	III	61887-1-AA	0.039	gals
PT BRAND 175 MICROCARB	I	499-381-AA-499	0.031	gals
CINNAMITE	III	58866-12-ZA-65626	0.018	gals
MICRO-GEN PRO-CONTROL ANT BAIT	IV	11540-20-AA-11540	0.008	gals
SUN SPRAY ULTRA-FINE SPRAY OIL	I	862-23-AA-53219	0.008	gals

Department of Recreation and Parks - Pesticide Use Graphs

Figure 42

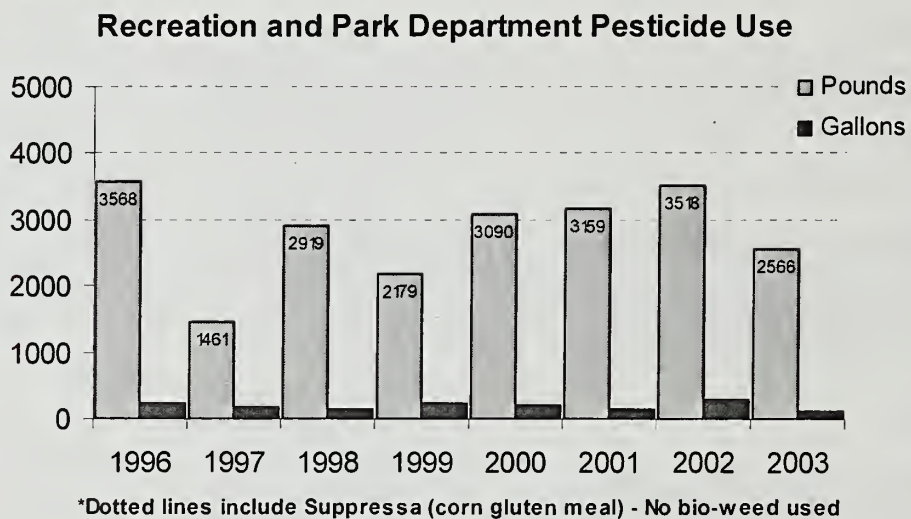


Figure 43

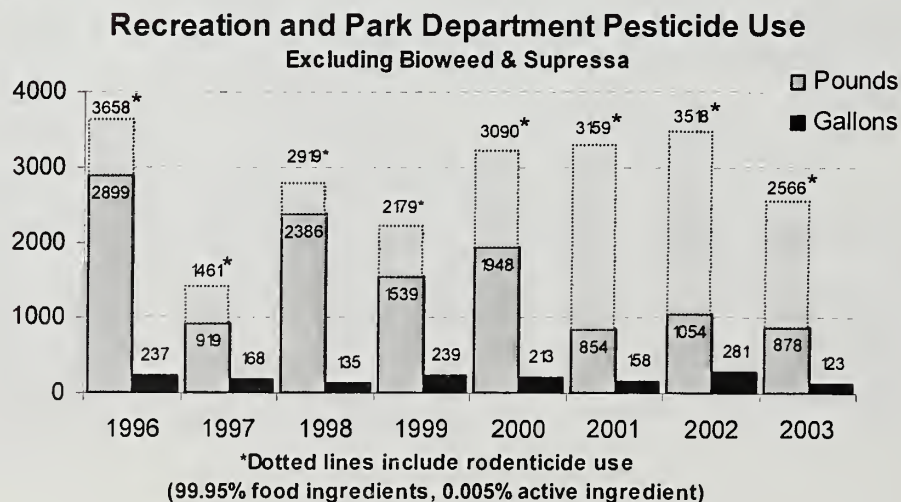


Figure 44

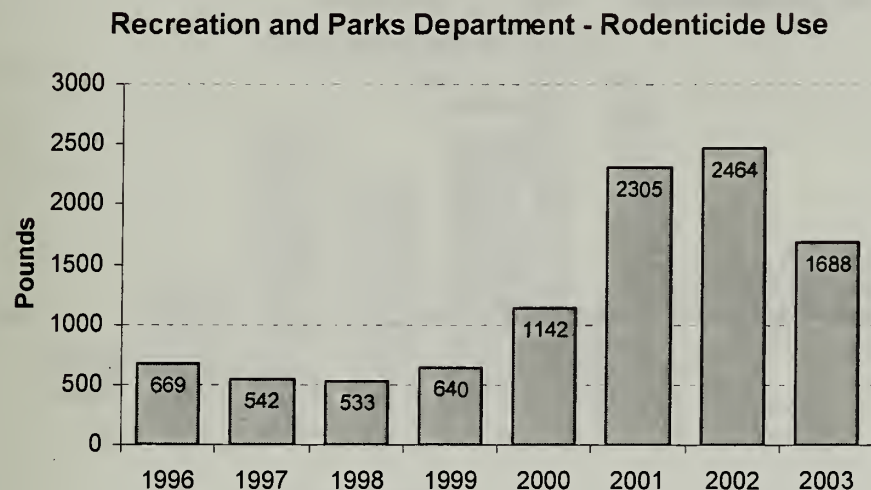


Figure 45

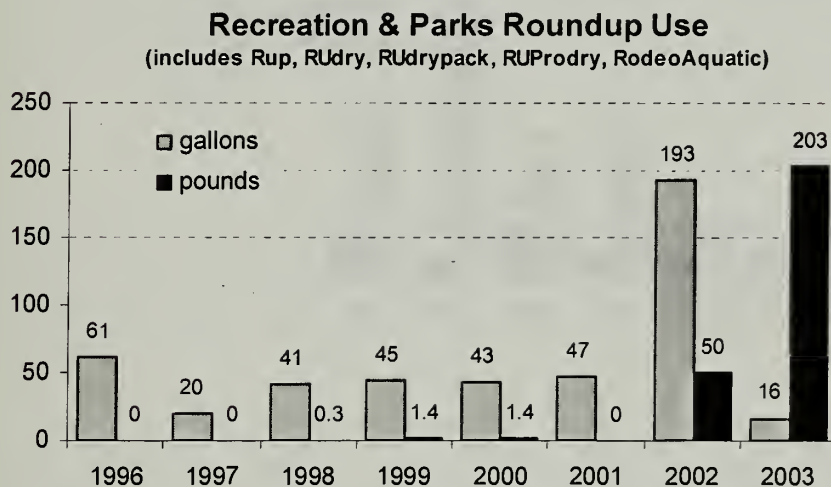


Figure 46

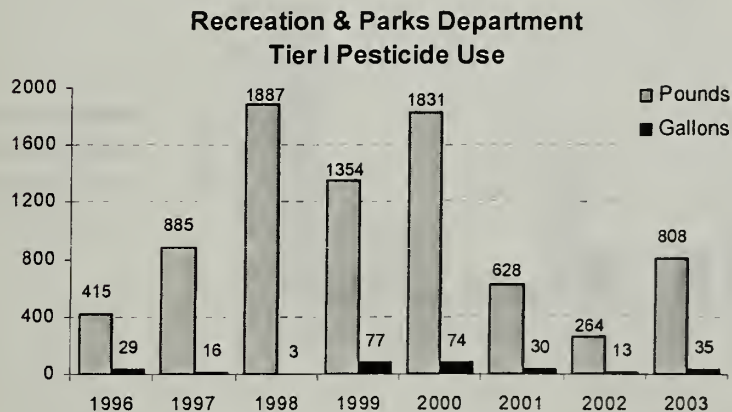


Figure 47

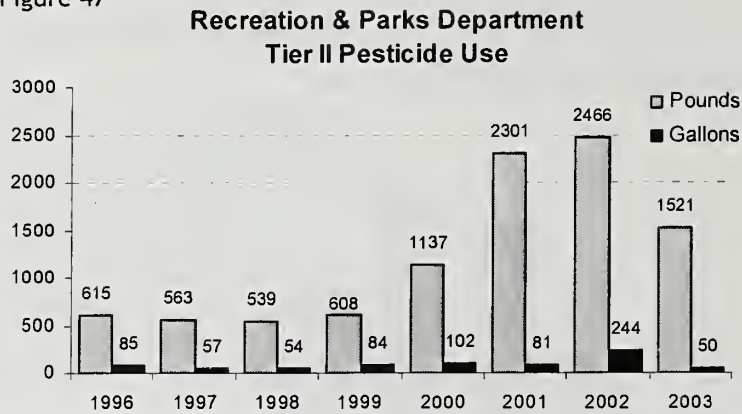


Figure 48

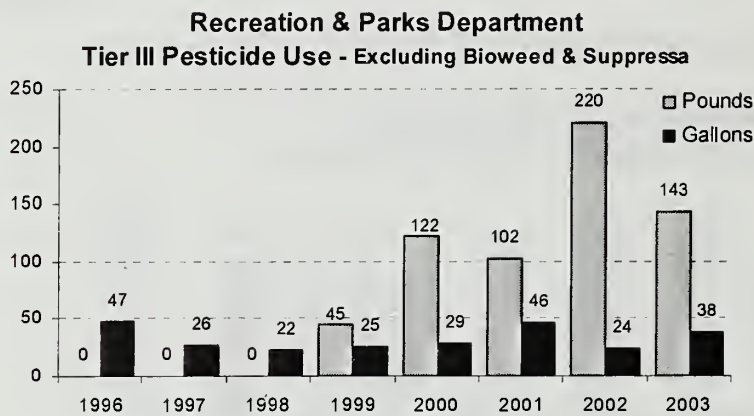


Figure 49

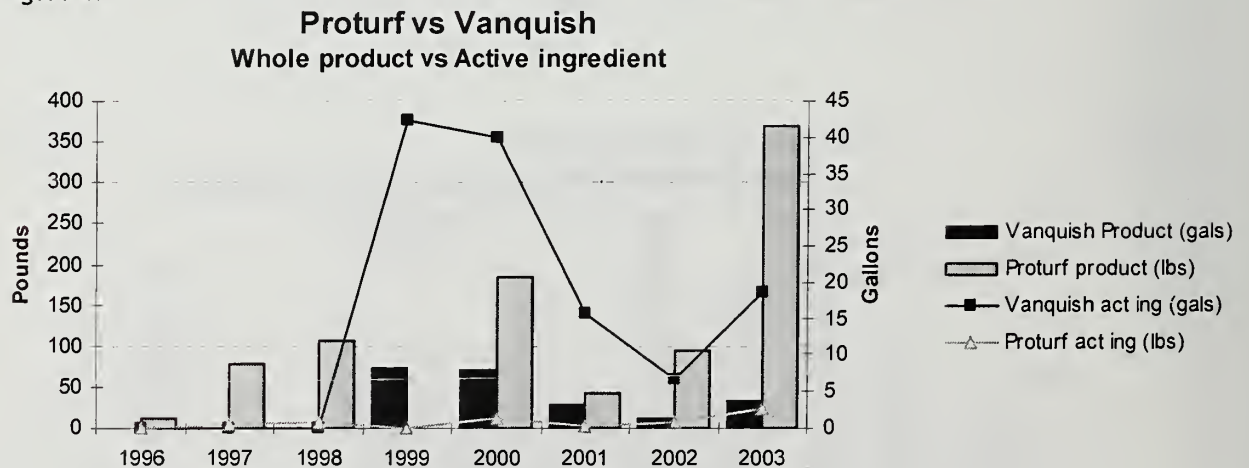
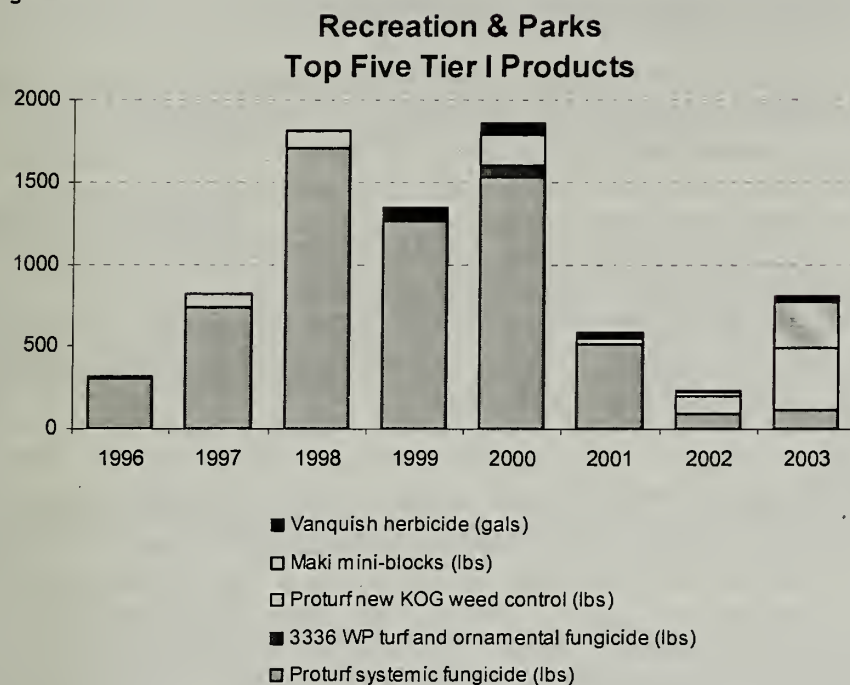


Figure 50



San Francisco International Airport

San Francisco International Airport (SFIA) is unique among City departments in that the airport leases much of its property to a wide variety of tenants, ranging from large hangars leased to major airlines to small booths rented to food vendors. SFIA maintains a contract with Applied Pest Management to perform most of its pesticide application and routine pest management services. However, the individual tenants often maintain separate contracts with their own PCO vendors, or perform pest management activities themselves. In addition, SFIA has various agreements with other agencies, notably CalTrans, to manage pests and weeds on their properties. Finally, large parts of the airport are subject to stringent FAA regulations governing weed height, fire hazards, and bird populations. Within such a complex context, communication and coordination of pest management efforts are a challenge.

Trends in Amounts Used

SFIA pesticide use fell dramatically from 1996 to 2001, with a 82% reduction in total pounds used and an 88% reduction in gallons (Figure 51). However, pesticide use bounced back in 2002 and 2003. In pounds, the largest share of the increase since 2001 was in Tier III (least hazard) products such as mosquito larvicides and slug bait. The use of glyphosate-based herbicides (such as Roundup® - Tier II) and rodenticides (mostly Tier I) also increased during this period, due in part to the installation of new freeway landscaping in 2001. In terms of raw poundage, the total pesticide reduction since 1996 now stands at 27%, with a 74% reduction in gallons.

In 2003, the most-used pesticides were:

Contrac All-Weather Blox (Tier I)	65.6 lbs. (out of 153.9 lbs. total)
Vectobac-G Biological Mosquito Larvicide (Tier III)	53 lbs. (out of 153.9 lbs. total)
Roundup Pro Herbicide (Tier II)	43.2 gals. (out of 55 gals. total)
Golden Bear Mosquito Larvicide GB-1111 (Tier II)	3.8 gals. (out of 55 gals. total)

RoundUp Use

Total herbicide use has increased since 2002, with Roundup® use remaining approximately the same (Figs. 52&53). While use has decreased 91% since 1996, there was a 35% increase between 2002 and 2003. This increase can be explained by the expansion of the airport's landscaped areas, which have approximately tripled since 2000. There has not been a proportional increase in personnel available to do manual weed cutting. A considerable portion the new acreage is along freeways, where spraying is sometimes preferable to manual cutting for safety reasons. SFIA staff are experimenting with the use of goats for vegetation management, higher tolerance levels for weeds, and weed whacking as ways to reduce herbicide use. However, staff predicted that Roundup use will continue to increase somewhat due to SFIA runway expansion, budgetary restrictions, and FAA regulations pertaining to weeds on airfields.

Rodenticide Use

As with citywide rodenticide use, rodenticide use figures reflect redoubled efforts at rat control, exacerbated by the airport's growth (Fig. 53). Rodenticide use increased by 40% between 2002 and 2003, mostly *Contrac all weather blocks* with an active ingredient of bromadiolone. Although many sanitation measures have been implemented (such as ensuring that refuse containers are tightly covered), the complex leasing arrangements at SFIA sometimes limit the

ability of airport pest management staff to implement adequate pest prevention efforts. Problem areas include the taxi waiting area and loading docks which, despite SFIA's repeated requests for sanitation, continue to be a food source problem for rodents and birds. The best strategy SFIA has found to manage rodent populations in these areas is baiting. The use of rodenticides (Tier I) by SFIA is therefore predicted to continue. (In response to concerns over increased rodenticide use citywide, SFE plans to revise its rodent IPM plans.)

Mosquito Control

The use of mosquito larvicides increased from almost none in 2002 to 61 pounds/3.8 gals in 2003 (Fig. 55). The increased emphasis on West Nile virus containment, and the important role played by airports in the spread of mosquito-vectored diseases, accounts for the increase. Most of these treatments involved Vectobac-G and Mosquito Dunks, both Tier III products. Both have the bacteria *Bacillus thuringiensis* as the active ingredient, and are applied directly to water to kill mosquito larvae. Some SFIA marshlands are home to the endangered San Francisco garter snake, and therefore require special precautions by land managers. SFIA maintains an agreement with the San Mateo County Mosquito Abatement District to treat parts of its marshland by helicopter, and these treatments are expected to increase in coming years.

Trends in Toxicity

Rodenticides are the only Tier I product used by SFIA, but—due to reasons mentioned above—use of these products has increased (Fig. 56). Because of the predicted continuation of the rodent problem in selected areas mentioned above, the use of this Tier I product by SFIA is expected to continue.

As in previous years, the vast majority of Tier II product use was for weed control on rights-of-way, primarily using Roundup Pro (Fig. 57). However, the proportion used on rights-of-way in 2003 decreased from 98% to 61% due to increases in pesticide use for public health and landscaped areas. Vectobac-G and Mosquito Dunks account for almost all of Tier III pesticide use (Fig. 58). Usage of these products has increased recently and is expected to remain high.

Table 11. Pesticide Products Used by SFIA, 2003

Product	Hazard Tier	EPA Reg Number	Amnt Used
Oust XP Herbicide by DuPont	II	352-601-AA-352	8.6094 lbs
Pendulum WDG herbicide	II	241-340-AA-241	8.2938 lbs
Mosquito dunks	III	6218-47-ZB-6218	7.5 lbs
Contrac all-weather blox	I	12455-79-AA-12455	65.5625 lbs
Oust weed killer by DuPont	II	352-401-AA-352	6.25 lbs
Vectobac-G biological mosquito larvicide	III	275-50-AA-275	53 lbs
Roundup Pro herbicide	II	524-475-ZA-524	43.22 gals
Golden Bear Mosquito Larvicide GB-1111	II	8329-72	3.8302 gals
Garlon 4	II	62719-40-ZB-62719	3.6391 gals
Eaton's answer for control of pocket gophers	II	56-57-AA-56	3.5 lbs
Rodeo aquatic herbicide	II	524-343-AA-524	3.0 gals
M-PEDE Insecticide	II	53219-6-AA-53219	1.6523 gals
Maxforce roach bait F.05	II	64248-11-AA-64248	0.4063 lbs
TEMPO 20 WP Insectide	I	3125-380-AA-3125	0.3275 lbs
Fluorguard ant control baits	III	1812-348-AA-279	0.279 lbs
Trifluralin (aka Niban bait)	II	64405-2-AA-64405	0.125 lbs
PT brand avert cockroach	II	499-406-AA-499	0.0371 gals
CMR Herbicide activator	III	64218-14	0.0352 gals
Avert cockroach gel	II	499-410-AA-499	0.0234 gals
Drax ant kil gel	II	9444-131-AA-9444	0.0234 gals
Whitmire avert prescription treatment 32	II	499-394-AA-499	0.0195 gals
Maxforce IBF4 Carpenter Ant Bait	II	64248-21	0.0137 gals
Turflon ester	II	62719-258-AA-62719	0.0137 gals
Precor 1% emulsifiable concentrate	II	2724-352-AA-50809	0.0117 gals
Avert prescription treatment 310		499-294-AA-499	0.0112 lbs

San Francisco International Airport – Pesticide Use Graphs

Figure 51

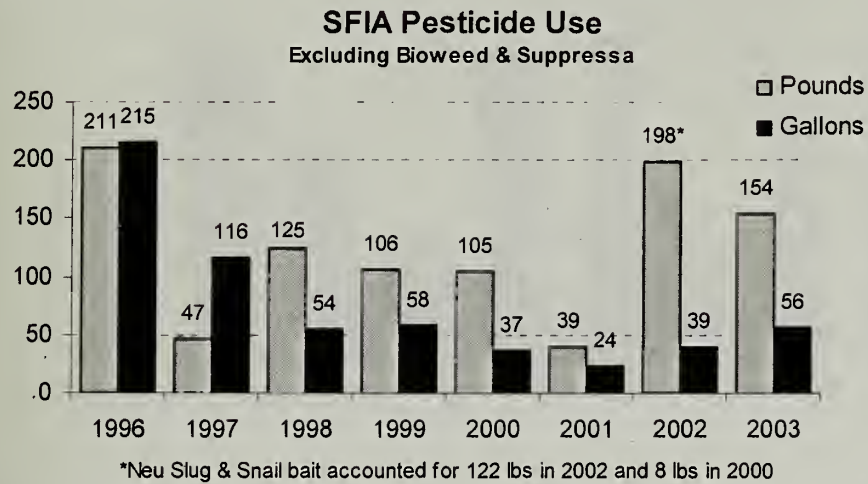


Figure 52

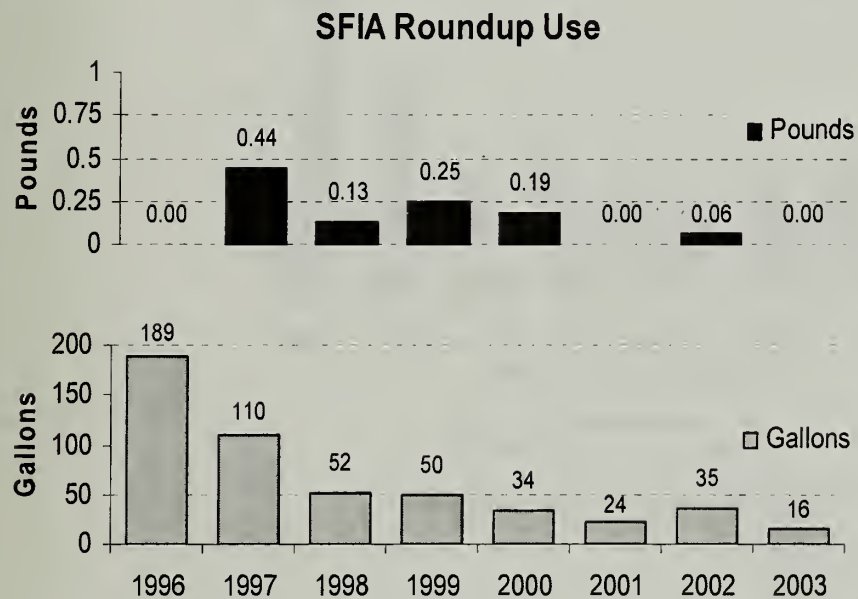


Figure 53

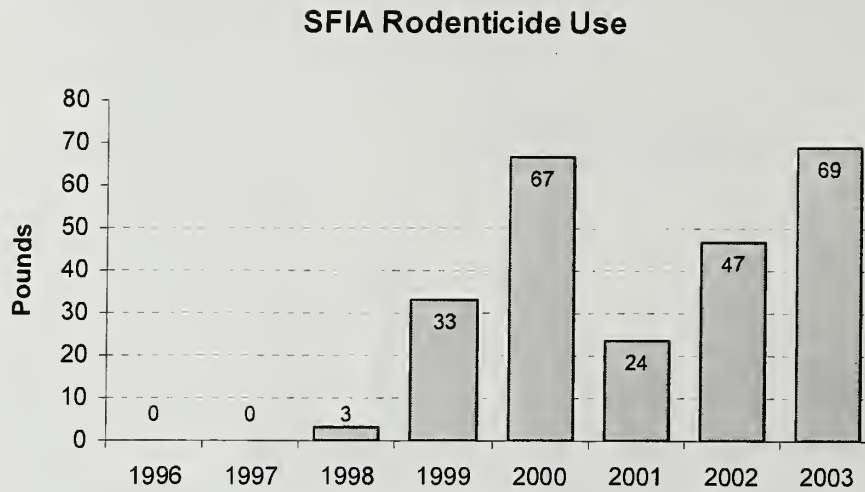


Figure 54

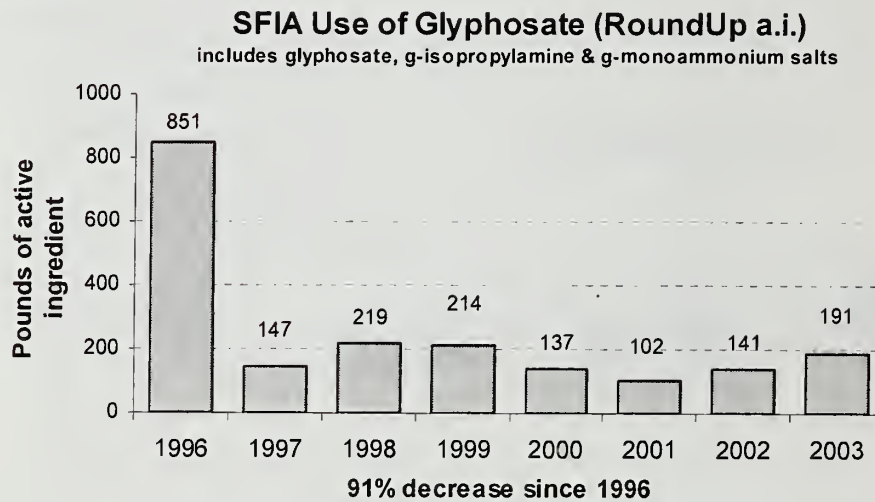


Figure 55

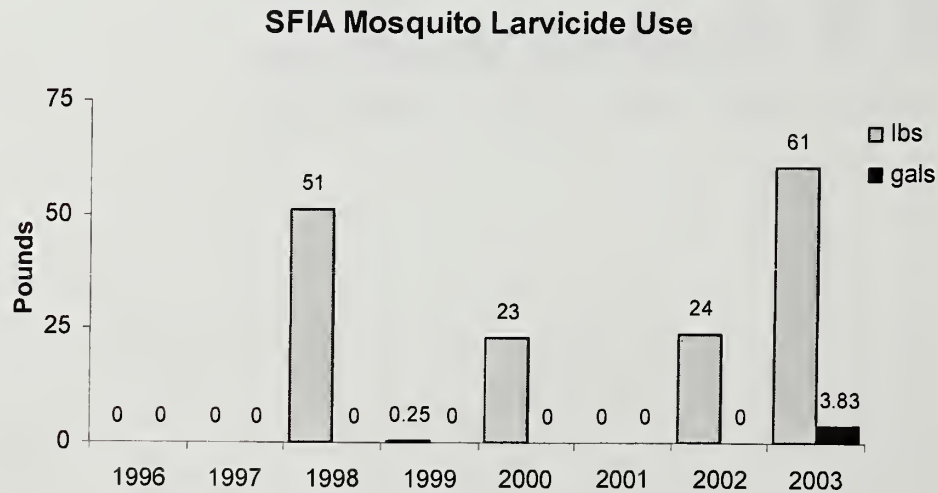


Figure 56

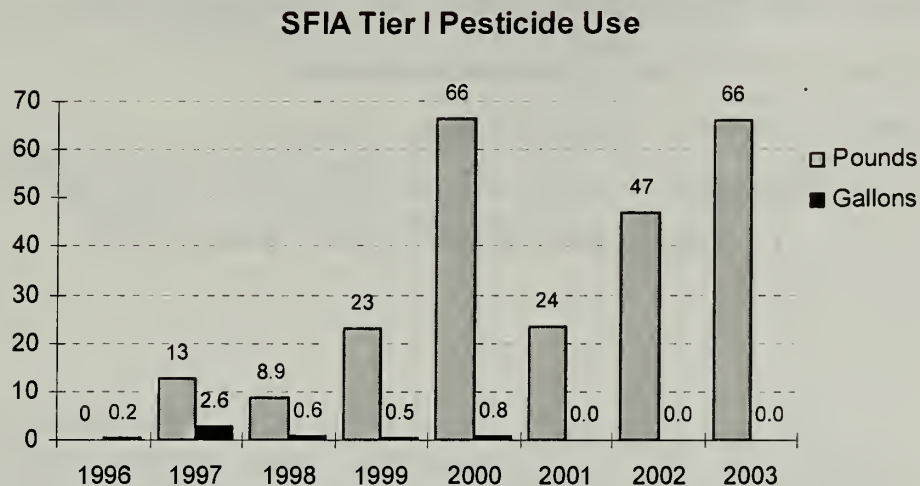


Figure 57

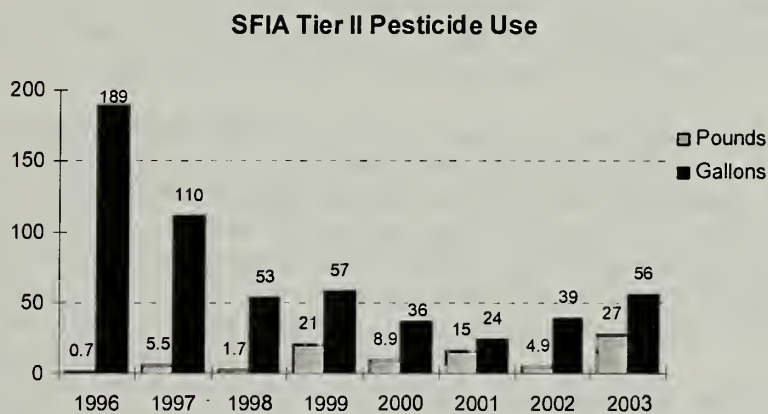
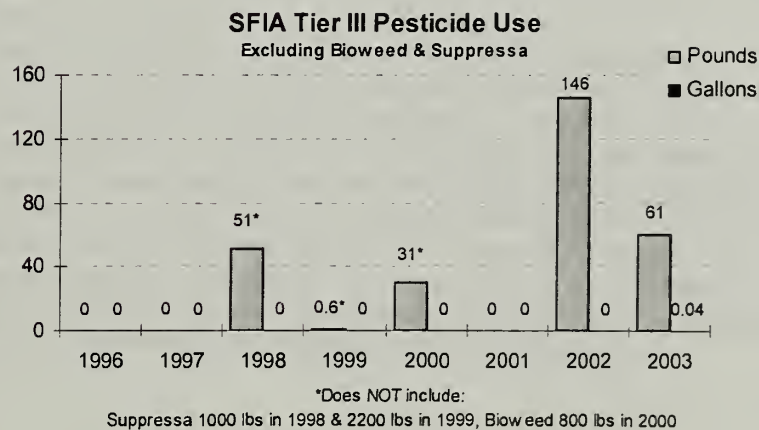


Figure 58



Attachments – Integrated Pest Management Program Annual Report - 2003

Attachment A: 2004 San Francisco Reduced Risk Pesticide List

Attachment B: Prototype San Francisco IPM Program Newsletter



DEPARTMENT OF THE ENVIRONMENT
CITY AND COUNTY OF SAN FRANCISCO
JARED BLUMENFELD, DIRECTOR

Integrated Pest Management Program
Reduced Risk Pesticide List

January 2004

Preamble

The following list represents the pesticide products approved for use under San Francisco's Integrated Pest Management Ordinance (Adopted 10/96, Section 39.8(f), San Francisco Municipal Code). The list will be updated on an as-needed basis to reflect the availability of new reduced risk products and the removal of products with the greatest human health and environmental concern. Products are designated as Allowed (A), Limited Use (L), and Limited Use of Special Concern (L*). Each limited use product is accompanied by the specific circumstances under which it is approved for use. In all cases, restrictions on use as determined by the label are to be followed as required by law.

Integrated Pest Management (IPM) Programs involve a number of elements to control pests while ensuring a safe working and play environment. Chemical pesticides represent only a single control strategy and are used only as a last resort. Thus all chemicals included in the Adopted List are assumed to be used only after programs are in place to improve sanitation, prevent pest infestation, and implement non-chemical management measures. If such a pest management program proves insufficient to control a pest then the chemicals listed below may be utilized as tools according to the restrictions specified for each pesticide product.

San Francisco's IPM ordinance allows for chemicals to be used that are not on the Adopted List through an exemption process. The Department of the Environment reviews all exemption requests and exemptions will only be granted in cases of well-documented need for the pesticide and when all other alternatives have been tried or deemed impractical. In addition, requesting departments must develop a pest management plan for preventing further use of the pesticide.

One important goal of an IPM program is to reduce the unnecessary use of chemical pesticides. In relation to this goal, the term, *targeted application*, refers to pesticides applied only to the pest and not to adjacent non-targets. Several products on the Adopted List, specifically pre-emergent herbicides, fungicides, and some post-emergent herbicides are used in broadcast applications where the product is spread over an entire area and not just onto the targeted pests. Although these products currently meet the reduced risk criteria, their use is of special concern in an IPM program. It is the goal of the IPM program to phase out the use of these products and departments who use them will be expected to track their use closely, develop alternative control strategies and justify the continuing need for these products at the end of the year.

11 Grove Street, SAN FRANCISCO, CALIFORNIA 94102

WWW.SFENVIRONMENT.COM

TELEPHONE (415) 355-3700 FAX 554-6393 E-MAIL: ENVIRONMENT@SFGOV.ORG

Site-Specific Rodenticide Plan For Control of Rats and Mice. 12/8/99

Due to the concern over primary and secondary poisoning the type of rodenticide and the manner in which it is applied will be determined by the general site characteristics.

Landscaped area: area under cultivation

Natural area: within urban setting or wilderness, significant wildlife concern

Primary poisoning: non-target animal eats poison directly

Secondary poisoning: non-target animal eats poisoned target animal as prey

General Site Description

Rodenticide Use

Interior of structures with occupants
(i.e. office space, recreation sites)

Trapping only.

Interior of non-enclosed structures
(i.e. storage, stables, airport service areas)

Secure and anchored bait stations can be placed inside on a preventative basis. Single feeding OK especially when other sources of food are present and when have public health concerns (ex. Hanta)

Exterior of structures in urbanized areas
(i.e. perimeter of offices)

Secure and anchored bait stations around perimeter, single feeding OK but use Brodifacoum as last resort. No broadcast baits or pellets. Use mouse sized pellets only, must be placed far into burrows.

Exterior of structures in natural areas

Multiple feeding baits secured within bait boxes or buried in burrows. No pellets. Single feeding bait used only as last resort in case of human health concern or structural integrity.

Inside of sewers or sewage treatment facilities

Baits must be secured either inside the sewer or inside a bait box. Any single feeding OK.

Landscape not adjacent to a natural area

Bait placed deep inside burrows, minimize use of pellets, mouse sized pellets only, must be buried deep in the burrow. Use Brodifacoum as last resort.

Natural area or landscape adjacent to a natural area

Baiting should be limited to sensitive sites (ex. campfire area) otherwise emphasis is on preventing infestation of structures. Multiple feeding baits that are secured inside bait boxes or burrows. No use of pellets or single feeding rodenticides.

Pesticide Type W=herbicide in water F=fungicide I=insecticide H=herbicide M=molluscicide V=vertebrate A=adjuvant P=plant hormone	Use Category A = allowed L = limited L* = special concern	Hazard Tier *=highest hazard, ***=lowest hazard, /=insufficient data	Product Name	Active Ingredients	EPA Reg #	Use Limitations	Amount used in 2002
I	L	*	20 Mule Team Tim-Bor Industrial	disodium octaborate	1624-39-ZC-1624	For control and prevention of termites, wood-destroying beetles, and carpenter ants. Recommendation of Branch III pest control operator required for termites and beetles; recommendation of Branch II pest control operator required for carpenter ants.	977.5 lbs
F	L*	*	3336 WP	methyI thioallophanate	1001-63-AA-1001	For use in greenhouse situations only	4.8 lbs
I	L	**	Agnique MMF	isooctadecyl-hydroxyl	2302-14-AA-2302	Standing water, human health concerns.	277.4 lbs + 0.92 gals
I	L	**	Altosid Briquets by Zoecon	methoprene	2724-375-ZA-2724	PUC for contained sewage treatment facilities. For public health use. Not for use in estuarine environments.	
I	L	**	Altosid Pellets by Zoecon	methoprene	2724-488-ZA-2724	Not for use in estuarine environments	
F	L	/	AQ 10 Biofungicide	Ampelomyces	55638-16-AA-55638	Nurseries, roses, dahlias for powdery mildew. More information is needed an active ingredient.	
W	L	**	Aquamaster Herbicide (equivalent to Rodeo)	Glyphosate	524-343-ZF	May damage non-target plants. Use for emergent plants in ponds, lakes, drainage canals, and areas around water or within watershed areas. Only as a last resort when other management practices are ineffective. NOTE: Equivalent to "Rodeo Emerged Aquatic Weed and Brush Herbicide," an older product. Rodeo in storage may be used under the same limitations.	
W	A	***	Aquashade	acid yellow-23, acid blue 4	33068-1-AA-33068		16 gals

Pesticide Type	Use Category	Hazard Tier	Product Name	Active Ingredients	EPA Reg #	Use Limitations	Amount used in 2002
I	A	**	Avert Cockroach Bait Station	abamectin	499-467-AA-499		
I	A	**	Avert Cockroach Gel	abamectin	499-410-AA-499		0.03 gals
I	L	**	Avid 0.15 EC	avermectin	618-96-AA-618	Nursery use only.	0.30 gals
I	L	**	Azatin XL	Azadirachtin	70051-27-AA-59807	Nurseries and established plants for interiorscapes.	0.01 gals
H	A	***	Bio-Weed	corn gluten meal	1051098-30001-AA-1051098		
I	L	**	Borid	boric acid	9444-129-ZA-9444	limit human exposure to dust	
I	L	***	BotaniGard ES	Beauveria bassiana strain	65626-8-ZA-65626	Control of thrips on landscaped plants. Biological product but some concern over bee toxicity.	1.96 gals
I	A	***	Cinnamite	Cinnamaldehyde	58866-12-ZA-65626		0.03 gals
A	A	***	CMR Silicone Surfactant	polymethylsiloxane, nonionic	1050775-50025-AA-1050775		
I	L	*	Conserve SC	Spinosad	62719-291	For use as a last resort in greenhouses. If feasible, alternate with other products to avoid the development of resistance.	
V	L	*	Contrac All-Weather Blox	bromadiolone	12455-79-AA-12455	High concern over 2nd poisoning, see site specific limits.	46.81 lbs
P	A	***	Dip'n Grow	indole-3-butyric acid	64388-1-AA-64388		
V	L	**	Ditrac supersize blox	diphacinone	12455-14-ZA-12455	Concern over 2nd poisoning, see site specific limits.	1119 lbs
V	L	**	Eaton's All-Weather Bait Blocks Rodenticide with Apple Flavorizer	diphacinone 0.005% Eugenol (clove oil) 21.4%, 2-phenethyl propionate 21.4%	56-41-ZA-56	Concern over 2nd poisoning, see site specific limits.	
H	L	/	EcoExempt HC	Rosemary oil 10%; wintergreen oil, mineral oil (inerts)	Exempt from EPA Reg.	Pending receipt of clove oil toxicity data, do not use in enclosed areas.	
I	A	***	EcoExempt IC		Exempt from EPA Reg.		
I	L	***	Enstar II Insect Growth Regulator	kinoprene	2724-476-AA-2724	Nurseries, roses.	

Pesticide Type	Use Category	Hazard Tier	Product Name	Active Ingredients	EPA Reg #	Use Limitations	Amount used in 2002
H	L	**	Ezject Selective Injection Herbicide	glyphosate	524-435-AA-524	Tree stump injection especially where resprouting is likely, prefer mechanical methods when possible such as stump grinding	0.19 lbs + 0.002 gals
V	L	*	Final Blox	brodifacoum	12455-89-AA-12455	Extreme concern over 2nd poisoning, see site specific limits	
H	L	**	Garlon 4	triclopyr	62719-40-ZB-62719	Targeted treatment of invasive exotics in parks, natural areas, right of ways. OK for fuel reduction, pilot alternative strategies.	19.30 gals
I	L	/	GC-Mite	Cottonseed oil 40%, clove oil 20%, garlic extract 10%	Exempt from EPA Reg.	Pending receipt of clove oil toxicity data, limit use in enclosed areas.	
V	L	/	Generation Mini-blocks	diethialone	7173-206-AA-7173	Unknown effects on 2nd poisoning, single feed,	
I	A	/	Gentrol IGR Concentrate	hydroprene	2724-351-ZA-2724		
I	L	**	Golden Bear Mosquito Larvicide GB-1111	Aliphatic Petroleum Hydrocarbon	8329- 72-AA	Apply only in conjunction with appropriate prevention measures (such as increasing water flow), or when prevention measures are impractical. Use within requirements on vector control activities set by the Calif. Dept. of Health Services.	
V	L	**	Gopher Getter type 2 Bait by Wilco	chlorophacinone	36029-50003-AA-36029	Damage to: dams, levies, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.	1.49 lbs
I	A	**	Gourmet Liquid Ant Bait	Disodium octaborate tetrahydrate (DOT) (2%)	73766-1-AA		
F	L*	*	Heritage Fungicide	azoxystrobin	10182-408-AA-10182	Consider/emphasize use of compost tea for preventative. To be used only as a spot treatment on greens, highest profile athletic fields. Improve aeration and monitoring programs.	2.00 lbs

Pesticide Type	Use Category	Hazard Tier	Product Name	Active Ingredients	EPA Reg #	Use Limitations	Amount used in 2002
I	A	***	Hot Pepper Wax Insect Repellent	capsaicin .00014%	67238-1-AA-67238		
I	A	***	Javelin WG	<i>Bacillus thuringiensis</i>	70051-66-AA-70051		
V	L	**	JB Eaton Top Gun All-Weather Bait Block Rodenticide	bromethalin	67517-66-56	Limited use to avoid rodent aversion to one specific bait. Use only in locked bait stations. High concern over secondary poisoning of birds.	
F/I	A	**	JMS Stylet Oil	petroleum distillates	65564-1-AA-65564		4.06 gals
V	L	**	JT Eaton Answer for the Control of Pocket Gophers	diphacinone	56-57-AA-56	Damage to: dams, levies, athletic fields, active recreation areas, structures, high cultural value or landmark areas. Public Health concerns.	304 lbs
F	A	***	Kaligreen	potassium bicarbonate	70231-1-AA-70231		1.97 lbs
V	L	*	Maki Mini Blocks	bromadiolone	7173-202-AA-7173	High concern over 2nd poisoning, see site specific limits	28.38 lbs
V	L	*	Maki Paraffin Blocks	bromadiolone	7173-189-AA-7173	High concern over 2nd poisoning, see site specific limits	
I	L*	*	Marathon 1% Granular Greenhouse and Nursery	imidacloprid	3125-452-AA-59807	Nursery use for control of white fly, not for use in propagation beds.	19.75 lbs
H	L	/	Matran 2	clove Oil	Exempt from EPA Reg.	Pending receipt of clove oil toxicity data, do not use in enclosed areas.	
I	L	**	Maxforce FC Professional Insect Control Ant Bait Stations	fipronil	64248-10-ZA-64248	Minimize use through prevention, possible concern over active ingredient.	
I	L	**	MaxForce FC Professional Insect Control Ant Killer Gel	fipronil .001%	64248-21-ZA	Minimize use through prevention, possible concern over active ingredient.	

Pesticide Type	Use Category	Hazard Tier	Product Name	Active Ingredients	EPA Reg #	Use Limitations	Amount used in 2002
I	L	**	Maxforce FC Professional Insect Control Roach Bait Stations	fipronil	64248-11-ZA-64248	Minimize use through prevention, possible concern over active ingredient.	0.03 lbs
I	L	**	Maxforce IBF4 Carpenter Ant Bait	fipronil	64248-21-ZA-64248	Minimize use through prevention, possible concern over active ingredient	
I	L	**	Maxforce Roach Killer Bait Gel	fipronil	64248-14-AA-64248	Minimize use through prevention, possible concern over active ingredient	0.51 lbs + 0.03 gals
I	A	***	Mosquito Dunks	Bacillus Thuringiensis	6218-47-ZB-6218		1.22 lbs
I	L	**	M-pede Insecticide/Fungicide	potassium salts /fatty acids	53219-6-ZC-53219	Nursery, specialty gardens, and Africanized Honey Bees.	6.60 gals
I	L	**	Nilban Granular Bait	orthoboric acid	64405-2-AA-64405	Outdoor restricted to planted areas, prefer containers; indoor must be in containers or inaccessible to humans	
I	L	***	Orange Guard	d-limonene	61887-1-AA-61887	Contact insecticides should be minimized especially indoors.	0.25 lbs + 0.03 gals
H	L	**	Oust XP Herbicide by DuPont	sulfometuron-methyl	352-601-AA-352	Rights of ways.	2.63 lbs
H	L*	**	Pendulum WDG Herbicide	pendimethalin	241-340-AA-241	One year limit. SFIA landscape use only. Use weed cloth whenever possible. Limit to high priority areas, including new plantings in hazardous areas too dangerous for handweeding. Renovations require exemption.	2.33 lbs
I	A	***	Pharorid	methoprene	2724-420-ZA-2724		
I	A	**	Prescription Treatment Brand Advance Liquid Ant Bait	Boric acid 1%	56- 72-AA- 499		

Pesticide Type	Use Category	Hazard Tier	Product Name	Active Ingredients	EPA Reg #	Use Limitations	Amount used in 2002
H	L*	*	Proturf New K-O-G Weed Control	dicamba	538-112-AA-538	One year limit. Spot application on greens only when hand-weeding is not feasible. Only for <i>Soliva sessilis</i> and <i>Cotula mexicana</i> in golf greens.	95.5 lbs
F	L	*	Proturf Systemic Fung.	thiophanate-methyl	538-88-ZB-538	Greens, highest profile athletic fields.	93 lbs
I	L*	*	PT Brand Ultra-Fine Oil	paraffinic oil	862-23-ZA-862	One year limit. Nursery and roses control of scale. Try Saf-T-Side and Spraytech oil as replacement.	
I	L	**	PT Brand Wasp-Freeze Wasp and Hornet Killer Formula 1	phenothrin, allethrin, CO2	499-362-ZA-499	Use only when a concern for public safety.	20.96 gals
I	A	***	Roach Terminal	oxypurinol, xanthine	1001-73-AA-1001		
F	A	/	Root Shield Drench	<i>Trichoderma harzianum</i>	68539-4-ZB-68539		
F	L*	*	Rootone Rooting Hormone	Thiram	264-499-AA-71004	Nursery use only. Problem with mixing and storage due to talc. Consider Dip'n Grow as alternative.	0.125 lbs
H	L	**	Roundup Pro Herbicide	glyphosate	524-475-ZA-524	Spot application of areas inaccessible or too dangerous for hand methods, right of ways, utility access, fire prevention. Use for cracks in hardscape and edging only as last resort. OK for renovation but must put in place weed prevention measures.	231.16 gals
H	L	**	Roundup ProDry	glyphosate	524-505-AA-524	same limitations as Roundup Pro	50 lbs + 0.53 gals
I	L	**	Saf-T-Side	paraffinic oil	48813-1-AA-48813	Trace of alkyl-phenol ethoxylates, avoid contact with surface waters.	
F	A	/	Serenade	Bacillus subtilis	69592-4-AA-69592		
M	A	***	Sluggo Slug and Snail Bait	iron phosphate	67702-3-AA-67702		
W	L	**	Sonar A.S.	fluridone	67690-4-AA-67690	Emergent plants in ponds, lakes, drainage canals. Only as a last resort when other mgmt. practices are ineffective.	

Pesticide Type	Use Category	Hazard Tier	Product Name	Active Ingredients	EPA Reg #	Use Limitations	Amount used in 2002
A	A	***	Spraytech Oil	soybean oil	65328-50001-AA-65328		5.75 gals
H	A	***	Suppressa	corn gluten meal	1051074-30001-AA-1051074		30 lbs
V	L	*	Talon-G Rodenticide Mini-Pellets (Contains Bitrex)	brodifacoum	10182-341-AA-10182	Extreme concern over primary and 2nd poisoning, see site specific limits.	15 lbs
I	L	**	Terro Ant Killer II Liquid Ant Baits	sodium tetraborate	149-8-ZB-149		2.46 gals
I	L	**	The Ecology Works Dust Mite and Flea Control	Disodium octaborate tetrahydrate (DOT) (98%)	67419-1-ZB	For flea and dust mite control when mechanical methods are impractical, in conjunction with prevention. Limit human exposure to dust.	
H	L	**	Turfion Ester (post)	triclopyr	62719-258-AA-62719	Targeted treatment of turf; broadcast application requires exemption	1.81 gals
F	A	/	TurfShield	Trichoderma strain	68539-3-ZC-68539		568 lbs
I	A	**	Uncle Alberts Ant Bait	Disodium Octaborate Tetrahydrate	73340-1		
F/I	A	***	Valent Volck Supreme Spray	petroleum oil	59639-20-AA-59639		0.78 gals
I	A	***	Vectobac-G Biological Mosquito Larvicide	Bacillus Thuringiensis	275-50-AA-275		129 lbs
V	A	***	Vectolex G Biological Mosquito Larvicide	bacillus sphaericus	275-77AA-275		46.04 lbs
V	L	*	Weatherblok Bait with Bitrex	brodifacoum	10182-339-AA-10182	Extreme concern over 2nd poisoning, see site specific limits	663.83 lbs

SF IPM News



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Prototype Edition May 2003

Corte Madera Waipuna Demonstration

The San Francisco IPM TAC was invited to the Town of Corte Madera, Marin County, to see a demonstration of the Waipuna Hot Water Weeding System. The unique aspect of this demonstration was that no company representatives were present so the staff spoke freely on the merits and drawbacks of using the system so far.

Corte Maderas IPM Policy has been in effect for about 1 year. They continue to search for alternatives to pesticide use. The Waipuna is part of their program for maintenance of medians on city streets.



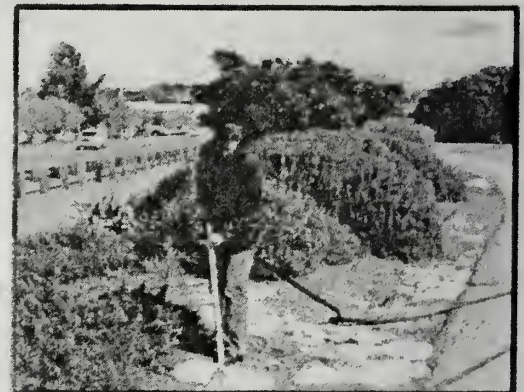
Bermuda grass and groundsel growing in a median strip along Paradise Drive. Narrow lanes and 45mph traffic speeds make this area dangerous for staff.

Other alternatives being explored are competitive planting, paving of narrow medians, altering pruning techniques to shade out weeds, mulching, weed-whipping, hand removal, weed mats, and use of herbicides. Landscape staff are currently testing EcoExempt IIC Herbicide for non-noxious weeds, using Roundup Pro only for nutsedge, field bindweed, and bermudagrass until these weeds are brought under control.

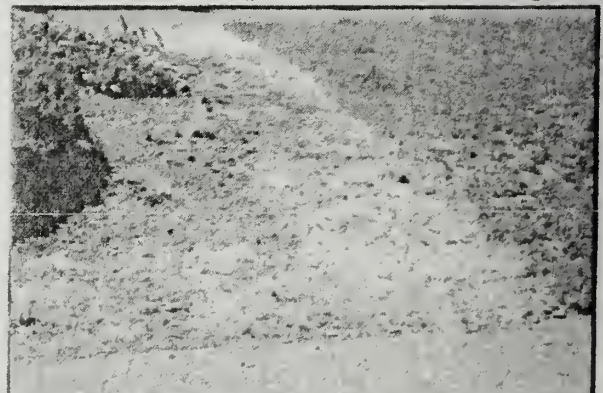
Part of the reason that Corte Madera is putting emphasis on the medians is because of the inherent danger to staff while working on these narrow strips. Traffic on some of the roads travels from 35 to 50 miles per hour, although as you may have guessed the posted speed limits are

from 25 to 40. In some situations, lanes are blocked off to protect staff, but this often causes traffic tie-ups and so lane closure is used as sparingly as is possible.

Corte Madera has plans to expand the use of the Waipuna to selected areas where time is not a significant factor.



Deanna Simon operates the Waipuna in a shrub area. In 48 hours weeds were dead and dessicated.

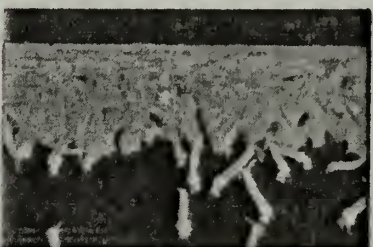


Edging done by Waipuna is neat and even 48 hours following application of hot water and foam. No drift or kill beyond the border of the edging was seen following application

Female mosquitos must have a blood meal (top right) to reproduce. This mosquito is feeding on a human, but mosquitos feed mainly on birds and small animals. Mosquitos can pass a disease from an animal host to humans, WNV being one example.



A huge population of mosquito larvae (bottom right). Mosquito life cycles can be short, 3 days for some species under optimum conditions.



West Nile Virus Presentation at Annual Safety Training

The San Mateo County Mosquito Abatement District (SMCMAD) gave West Nile Virus (WNV) presentations at all four SF IPM & Safety training sessions in April. Originally scheduled for an hour, questions from attendees stretched the presentations to almost 2 hours. The presenters, Dr. Chindi Peavey, Sasha Porshnikoff, and James Counts, also covered other vector borne diseases that occur in the Bay Area including plague, lyme disease, hanta virus, and encephalitis.

WNV is expected to be found in native populations of mosquitos (*Culex pipiens*) and birds this year in California. That is why mosquito abatement is so important for all of us. We can make sure that standing water is removed wherever possible. Report larger seasonal pools to your PCA so that actions can be taken to mitigate any mosquito problems.

Birds are a carrier of the infection. The district has set up monitoring flocks to track this and other diseases. SMCMAD has a program to test dead birds for the presence of the virus. Report all dead birds to them as soon as they are found. Birds must be dead less than 24 hours for the virus to be found.

A WNV brochure and other interesting information on vector borne diseases is available at their website: <http://www.smcmad.org>, follow the links to find the information you want. The site has links to other sites with related information.

Thanks again to Dr. Chindi Peavey, Sasha Porshnikoff, James Counts and the staff at SMCMAD for their great work and their assistance.

Upcoming Training:

Training sessions are currently being planned for the Green Flamer.

Conservatory to Reopen

The Conservatory of Flowers, closed following the Loma Prieta earthquake in October 1989, will reopen after 14 years. Extensive renovations were required to make the conservatory safe for visitors.

The victorian style conservatory suffered glass and structural damage during the earthquake. The staff has worked to keep the collections alive and healthy during the renovations, no small task. A new greenhouse, built in 2000, was used to store some of the tropical plant materials during the renovation process.

Ralph Montana handled the pest management duties at the conservatory during the renovation. His project to reduce or eliminate ants met with mixed results, but his cockroach control efforts made great strides.

We're all looking forward to the conservatory reopening and wish the entire staff there all the best.

Ask the Pest People

Q: *How will the late rains affect pest populations?*

A: Late rains will probably increase some diseases, anthracnose on Sycamores for one. Late rains can cause fungi to attack insects in more lethal amounts. In Marin County, warm winters with late rains have sometimes reduced Elm leaf beetles to unusually low levels.

Got a pest problem or want more info on a new management tactic, tool, or technique? Share your questions with staff by addressing questions to: **Robin Breuer**, City Toxics Reduction Coordinator, SF-DOE, Phone: 415/355-3759

San Francisco IPM Program Kudos

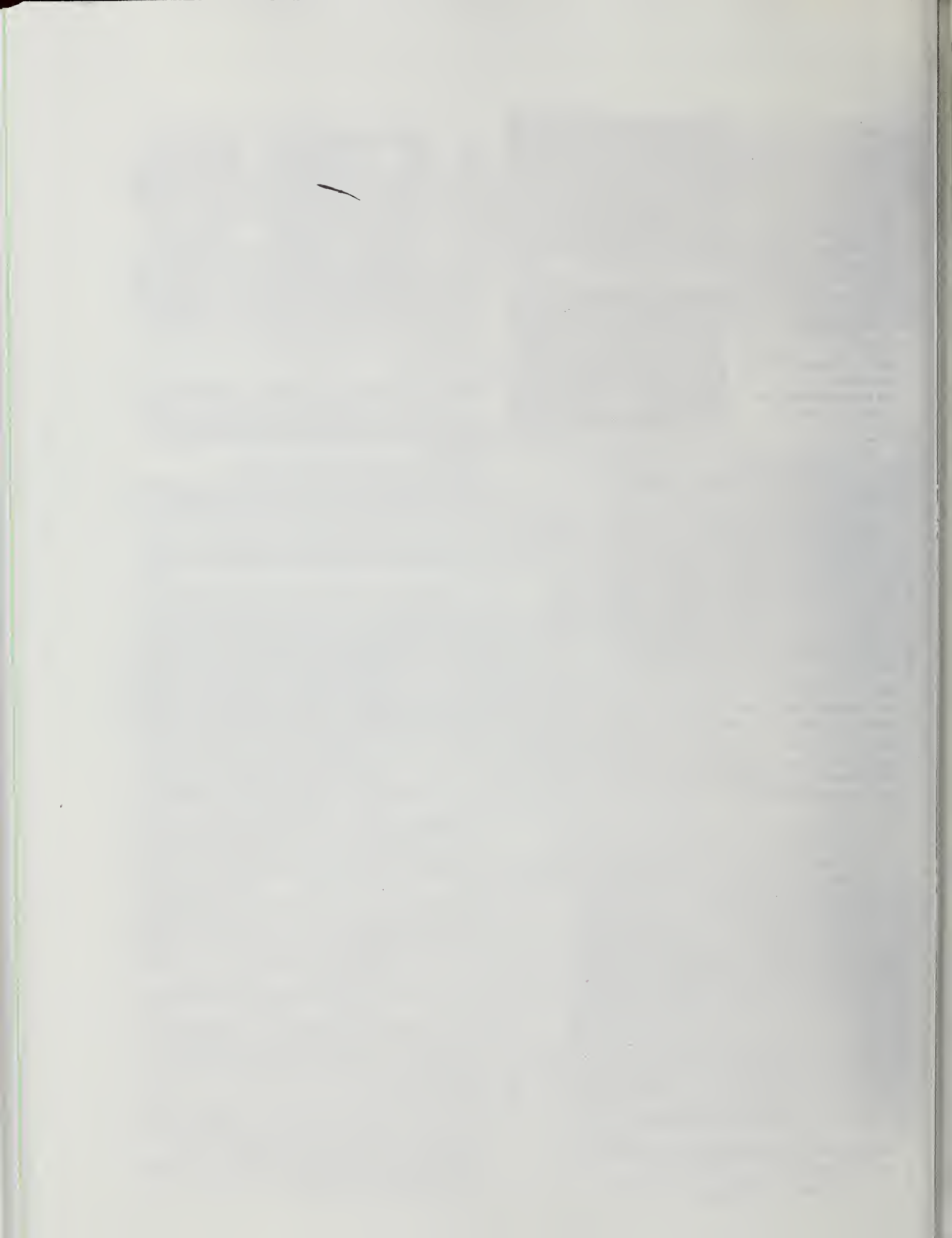
Thanks to everyone who participated in the San Francisco Flower & Garden Show. Once again you have made the booth a success. It is one of the venues for public outreach that really works.

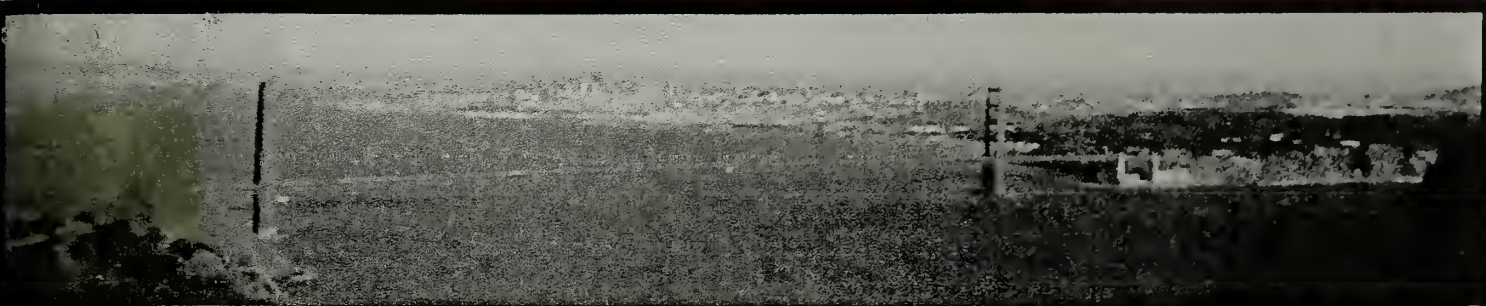
Thanks to all of the TAC members that attended the Waipuna demonstration in Corte Madera. The Corte Madera program is only a year old and our support for our North Bay neighbors is greatly appreciated by all.

Annual Use Report Deadline Approaches

Robin Breuer and Deanna Simon need your annual use reports by June 15th in order to prepare the fiscal year 2002-2003 pesticide use statistics. This report shows use for the past year and compares it to previous years' usage.

The data in this report is one of the gauges used to determine the success of the IPM Program in San Francisco. Please get your information to Robin and Deanna before the deadline.



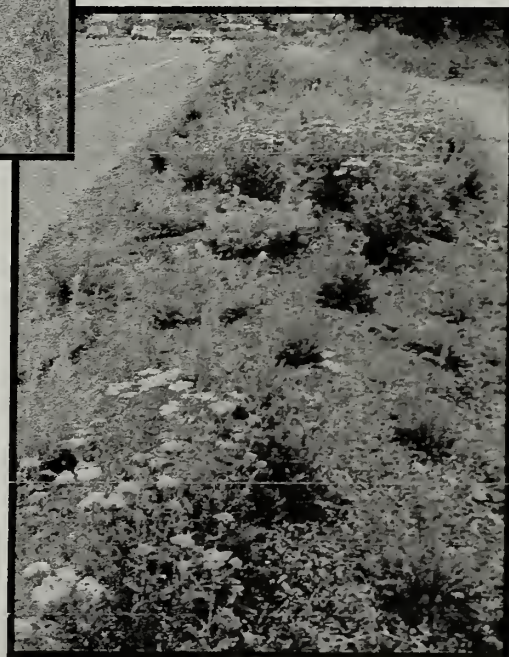
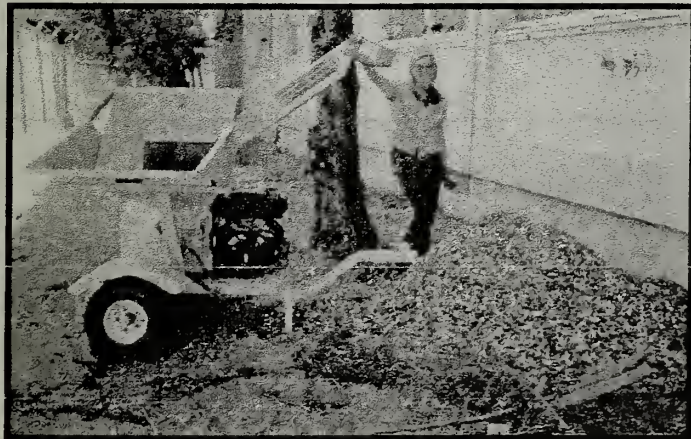
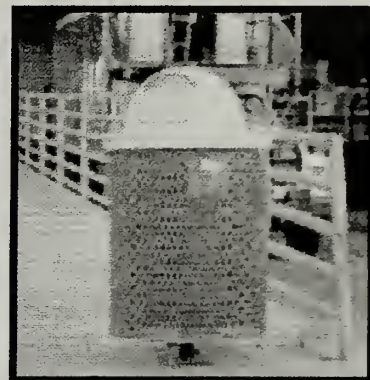


San Francisco Integrated Pest Management Program Combined Annual Report 2004 & 2005

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San Francisco Department of the Environment
Integrated Pest Management Program Report
Combined years 2004 and 2005

Contents

Executive Summary	2
Report.....	2
<i>Introduction</i>	2
<i>Reduced-Risk Pesticides List</i>	3
<i>Exemptions</i>	4
<i>Pesticide Use Data Collection and Analysis</i>	6
<i>Contract Development</i>	6
<i>Trainings / Conferences</i>	6
<i>Community, Regional, and National Outreach</i>	10
<i>Notes on Pesticide Use Data</i>	11
<i>Future Activities</i>	13
<i>Citywide Pesticide Use Trends</i>	14
<i>Department of Public Health</i>	22
<i>Department of Public Works</i>	26
<i>Department of Transportation (MUNI)</i>	29
<i>Port of San Francisco</i>	32
<i>Public Utilities Commission (PUC)</i>	35
<i>Department of Recreation & Parks (R&P)</i>	39
<i>San Francisco International Airport (SFIA)</i>	45

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San Francisco Department of the Environment
Integrated Pest Management Program

ANNUAL REPORT 2004-2005

Covering pesticide use data and program activities for calendar years 2004 and 2005

Debbie Raphael, Toxics Reduction Manager
Chris Geiger, City Toxics Reduction Coordinator
Deanna Simon, City Toxics Reduction Associate

Executive Summary

Throughout 2004 and 2005, San Francisco's Integrated Pest Management Program continued to play an active role in reducing pesticide hazards and promoting effective pest management. The program conducted integrated pest management (IPM) trainings for client departments, organized an annual IPM conference as part of UN World Environment Day, reviewed and updated the City's Reduced-Risk Pesticides List, supported new reduced-risk product-testing, and held monthly meetings of the IPM Technical Advisory Committee which includes representatives from all major City pesticide users. Departmental IPM staff continue to play a critical role in the success of San Francisco's IPM Program, lending expertise for decision-making, effort for testing less toxic alternatives, and sharing information from meetings and trainings with other field staff.

Overall, pesticide use increased by several measures in 2004-05. Two factors are responsible for the majority of this increase: Extensive use of reduced-risk pesticides for reducing populations of mosquitoes associated with spreading the West Nile virus, and the use of greater-than-usual amounts of herbicides, fungicides and insecticides at Harding Park golf course, in preparation for a major golf tournament. The golf course treatments contributed to a 25% increase (pounds) in the use of Tier I (most hazardous) products since 2003, although gallons of Tier I products declined 51% during that period. Despite this Tier I setback in 2005, the use of Tier I products has still dropped by 53% and 83% (pounds and gallons) since 1996. Total pounds and gallons of pesticides used have dropped by 55% and 72%, respectively, since the program's inception in 1996, use of the most common herbicide has dropped by 87%, and use of herbicides in general dropped 66% and 88% (pounds and gallons, respectively) in the same period.

Report

Introduction

Chapter 3, Section 305(g) of the Environment Code (Integrated Pest Management Ordinance) requires San Francisco's Department of Environment (SFE) to report on the progress of its Integrated Pest Management (IPM) Program to the Board of Supervisors. This report is submitted to fulfill that requirement, and summarizes the progress made by San Francisco's IPM Program, analysis of pesticide use data, and specific information on the City's departments doing most of the pest control on City property from January 2004 through December 2005. *While these reports are normally compiled annually, database malfunctions and staffing challenges delayed the 2004 report considerably, and we have therefore combined two years' worth of data in this document.*

Reduced-Risk Pesticides List

IPM Programs utilize a number of methods to control pests while ensuring a safe working and play environment. *Chemical pesticides represent only a single control strategy and are used only as a last resort.* Sanitation, other pest prevention measures, and non-chemical management approaches should all be implemented *first*.

San Francisco's Reduced-Risk Pesticide List (RRPL) represents the pesticide products approved for use under San Francisco's Integrated Pest Management Ordinance (Adopted 10/96, Chapter 3, San Francisco Environmental Code) when less toxic alternatives are deemed not feasible. No other pesticide products may be used on properties belonging to SF without an exemption from SFE (see summary of exemptions below).

Products on the List are designated as Allowed (A), Limited Use (L), and Limited Use of Special Concern (L*). Each limited-use product notation is accompanied by the specific circumstances under which it is approved for use – the "Use Limitations". These restrictions are in addition to product label restrictions, which are required by federal law. "L*" products carry an additional requirement: Uses of these products must be justified at a public hearing by a representative of the relevant City department.

The list is updated yearly to reflect the availability of new reduced risk products, removal of products with the greatest human health and environmental concern, or products no longer needed. To determine which products present the greatest hazards, SFE employs a robust tier-rating system. This tier system looks beyond the signal word and acute toxicity of a product and evaluates pesticides on such factors as chronic effects (i.e. cancer, reproductive harm), environmental effects (i.e. persistence, bioaccumulation, mobility, water quality), and non-target effects (i.e. impact on wildlife, bees). Using these criteria, products are grouped into tiers with Tier I being the most toxic, Tier III as least toxic, and Tier IV products not having enough information for evaluation.

The tier rating flags potential hazards in a product. The SF IPM Technical Advisory Committee then examines other factors affecting risk, particularly use patterns, the potential for exposure, and hazards of other alternatives, before recommending a pesticide for inclusion on the RRPL. SFE considers this approach to be an example of "anticipatory action to prevent harm," as required by the City's Precautionary Principle Ordinance (SF Environment Code, Chapter 1). For more information on the creation of this list see the report, "Guide to San Francisco's Reduced-Risk Pesticide List," at:

http://www.sfenvironment.com/aboutus/innovative/ipm/pest_list05/Approved_List_Guide.pdf

Four key points about San Francisco's list deserve emphasis:

- **A pesticide list is not an IPM program.** Pesticides should be the last resort, when all other tactics have failed.
- **This list is for institutions, not residents.** Many pesticides on the list were added for specialized purposes not found in residential settings. Homeowners will usually need few or no pesticides to successfully manage common pest problems.
- **Fewer listed products is not necessarily better.** IPM programs require a toolbox of alternatives, for example, alternative attractants in least-toxic ant baits. Therefore, a larger list is indicative of the diversity of pest problems encountered, and does not imply that

pesticide use is higher. The important measures of success are: Amount of highly toxic chemicals actually used (both active and inert ingredients), and overall effectiveness in pest suppression.

- **The SF RRPL only applies to City and County of San Francisco departments and properties.** Cities are only legally empowered to regulate their own pesticide use, not the pesticide use of residents or businesses.

Tables 1a and 1b summarize the changes made in the 2005 and 2006 RRPLs, respectively. The most updated list can be found on the web at www.sfenvironment.org under Less Toxic Pest Management – click on “*Reduced Risk Pesticide List*”.

Table 1a. Summary of 2005 Reduced-Risk Pesticide List changes (numbers of products)

	L* Limited Use, Special Concern <i>(Highest concern)</i>	L Limited Use <i>(Medium concern)</i>	A Allowed <i>(Lowest concern)</i>	Total
Pesticides added to 2004 list	0	3	6	9
Pesticides removed from 2004 list	1	5	5	11
Number of products on 2005 list	7	46	28	81

Table 1b. Summary of 2006 Reduced-Risk Pesticide List changes (numbers of products)

	L* Limited Use, Special Concern <i>(Highest concern)</i>	L Limited Use <i>(Medium concern)</i>	A Allowed <i>(Lowest concern)</i>	Total
Pesticides added to 2005 list	1	0	2	3
Pesticides removed from 2005 list	1	4	4	9
Number of products on 2006 list	7	42	26	75

Exemptions

Under the IPM Ordinance, SFE has the responsibility of reviewing and granting exemptions for the use of pesticides not listed on the Reduced Risk Pesticide List (RRPL). Applicants must demonstrate a good-faith effort to find alternatives to the banned pesticide; that effective, economic alternatives to the banned pesticide do not exist for the particular use; and that they have developed a reasonable plan for investigating alternatives to the banned pesticide during the exemption period. Exemptions may be granted as “trial,” “regular,” or “emergency” exemptions:

- ***Trial exemptions*** are granted for the purpose of testing products that show promise as less hazardous alternatives.
- ***Regular exemptions*** are considered for managing rare or unforeseen pest problems that cannot be adequately controlled using products on the RRPList.
- ***Emergency exemptions*** are permitted under the IPM ordinance when a “pest outbreak poses an immediate threat to public health or significant economic damage will result from failure to use a pesticide.”

Number of exemption requests in 2004: 7

Number of exemption requests in 2005: 9

Number of exemptions approved in 2004: 5 plus 1 emergency exemption

Number of exemptions approved in 2005: 9

Details: One trial exemption for experimental use of a carbon monoxide ground squirrel control product. One emergency exemption was for an outbreak of mosquitoes inside a working environment (see Table 2 below). Three exemptions granted in 2005 were never used. Seven of nine 2005 exemptions were for Harding Park golf course, in preparation for the AMEX Tournament (October, 2005).

Table 2. Summary of exemptions requested in 2004 and 2005

Date	Dept	Product	Type	Signal Word	Active Ingredient	Pest	Status
2/2/2004	DPH - Laguna Honda	CB-80	Regular	Caution	pyrethrins 1%, piperonyl butoxide 4%	sewer/phorid flies	approved
3/25/2004	Rec&Park	Vanquish	Regular	Caution	dicamba	Soliva sessilis on Harding/Fleming course	approved
6/3/2004	Rec&Park	Marathon II	Regular	Caution	imidacloprid	orchid aphids	approved
6/23/2004	Rec&Park	Sucker Stopper Concentrate	Regular	Danger	Naphthalene acetic acid	tree suckers sprouting from stumps	approved
8/24/2004	Rec&Park	CM Gas Cartridge	Trial	Warning	sodium nitrate 53%, charcoal 28%, inerts 19%	ground squirrels at sharp park golf course	approved
9/13/2004	Pestec	CB-80	Emergency -	Caution	pyrethrins	mosquitoes inside fire station house	n/a
11/29/2004	Rec&Park	Enforcer Flea Fogger XX	Regular	Caution	permethrin 0.44%, hydrotreated light petroleum distillates, pyriproxyfen 0.1%, pyrethrins 0.05%, MGK 0.4%,	fleas	DENIED
2/7/2005	Rec&Park	Vanquish	Regular	Caution	dicamba	Soliva sessilis on Harding/Fleming course	approved
3/17/2005	Rec&Park	Lontrel	Trial	Caution	Clopyralid	Soliva sessilis	approved NOT USED
5/20/2005	Rec&Park	ProZap Insect Guard	Regular	Caution	Dichlorvos, dimethyl phosphate	Earwigs	approved
5/20/2005	Rec&Park	DeltaDust	Regular	Caution	deltamethrin	Earwigs	approved NOT USED
9/21/2005	SFIA	Floramite	Regular	Caution	Bifenazate	Bamboo mites	approved NOT USED

Date	Dept	Product	Type	Signal Word	Active Ingredient	Pest	Status
9/22/2005	Rec&Park	Heritage	Regular	Caution	Azoxystrobin	Take-all patch	approved
9/22/2005	Rec&Park	Merit	Regular	Caution	imidacloprid	Crane flies, cutworms	approved
10/14/2005	Rec&Park	Vanquish	Regular	Caution	dicamba	Soliva sessilis	approved
12/5/2005	PUC	Transline	Regular	Caution	Clopyralid	Yellowstar Thistle	approved

Pesticide Use Data Collection and Analysis

Pesticide use data collection is currently accomplished using a customized Microsoft Access database; "satellite" versions in various City departments send data to the central SFE database. In 2005 and again in early 2006, database problems caused substantial delays and entailed significant staff time to repair (the database was completely inoperable for the month of December, 2005.) Updating this system is challenging but essential, so we continue to work with the SF Department of Technology and Information Services (DTIS) to create a centralized, web-enabled database. We expect it to be up and running sometime in 2006.

We continue to track visits to buildings during which pests are managed without the use of chemical controls (using prevention, monitoring, physical, and mechanical methods instead). Thus far, this system is only in place for data reported by the City's primary pest control contractor, Pestec. In 2004 and 2005, 52% and 63% of these visits, respectively, did not require application of a pesticide. This data shows that Pestec uses chemicals as a last resort, not as a generic solution. With the upcoming web-enabled database, all City pest managers will be able to track the use of vacuuming, washing, steaming, trapping, weed-whacking, weed-torching, and a growing list of mechanical methods. Though the data will not be precise (it is impossible to track every activity involved in pest management) and it will take several years to see any trends, we feel it is valuable to document the efforts of City staff to use alternatives to pesticides.

Contract Development

All structural pest control is conducted by outside contractors except in the Department of Recreation and Parks. The citywide term contract for pest control is currently held by APM (SF International Airport) and Pestec (all other departments). This contract will expire in 2007, and the Office of Contract Administration asked SFE for assistance on the new contract in early 2006. The new contract will include IPM-specific language and requirements for the new Request for Qualifications (RFQs) and Request for Bids (RFBs).

Trainings / Conferences

Key to the City's successful implementation of its IPM program is the ongoing training of City staff at all levels. SFE staff has been working with City Departments to organize, coordinate and provide a variety of training opportunities. Most training events are free of charge to participating departments and funded from the SFE IPM budget. Listed below is a summary of these training events held in 2004.

Technical Advisory Committee (TAC) Meetings: Each month a Technical Advisory Committee Meeting convenes to exchange information and discuss current pest control techniques, and representatives from the seven "big user" departments meet to discuss implementation of the IPM program. Most meetings feature a speaker on technical subjects of interest to the group. Participants include departmental IPM Coordinators, safety and environmental compliance staff, pest control contractors, independent IPM experts, pest management staff from other local entities (National Park Service, Presidio Trust, SF Unified School District, University of San Francisco, UCSF), and community members. The City Toxics Reduction Coordinator from SFE chairs these meetings and sets the agendas.

IPM TAC Meeting Topics in 2004

January- No meeting, IPM Conference instead
February- Rodenticide toxicity, Duane Schnaubel, CDFA
March- Invasive Weeds, Peter Brastow NPS
April- Mosquito Management in SF Part I, Rajiv Bhatia SFDPH
May- Mosquito Management in SF Part II, Rajiv Bhatia SFDPH
June- Predatory Mites of Landscape and Greenhouse Insect Control, Ron Whitehurst Rincon Vitova Insectaries
July- Turf Management, Ali Harivandi UC Cooperative Extension
August – Efficacy Comparison of Less Toxic Herbicides, Cheryl Wilen San Diego Cooperative Extension
September – Pesticide Toxicity and Endocrine Disruption, Chris Geiger SFEnvironment
October – Cancelled in preference of Gopher Management Training in coordination with Recreation & Parks Department *Sustainable Parks Workshop*
November – Yearly Review of Reduced Risk Pesticide List
December – Ground Squirrel Management, Sheila Daar, Daar IPM Consulting Group

IPM TAC Meeting Topics in 2005

January - Soil Health, Lisa Hokholt, District Conservationist, USDA
February – Tour of mosquito fish breeding Facility, Chris Miller, Contra Costa Mosquito Abatement District
March – Spiders, Steve Lew, UC Berkeley
April - Ecological Effects of Least-Toxic Pesticides, Dr. Marshall W. Johnson, UC Riverside Department of Entomology
May – Cancelled due to World Environment Day preparations
June – Cancelled due to SF Urban IPM Conference
July – Green Building & IPM, Mark Palmer, SF Dept. of the Environment
August – IPM Program review
September – Pesticides, Mites, and the Decline of Bee Biodiversity, Gregory Kellett, CoEvolution Institute
October - Urban Forestry and IPM in San Francisco, Alexis Harte, SF Dept. of the Environment
November – Mystery Mites: Four mites you might encounter in structural pest management, Art Slater, Slater's Pest Control
December – Updating the SF Reduced-Risk Pesticide List

Workshops and Trainings: Each year we offer pesticide safety trainings to CCSF pest management staff serving as pesticide applicators, as well as other topic-specific workshops and trainings. SFE is currently increasing coordination efforts with other municipalities to expand the

types and numbers of trainings we are able to offer our staff, and to increase their potential to change habits on a regional level. SFE staff arrange for continuing education credit issued by the California Department of Pesticide Regulation, International Society of Arborists, or other appropriate organizations.

TRAINING SESSIONS HELD IN 2004:

January – December 2004

Monthly IPM Technical Advisory Committee Meetings (see above)
2 hours each, 10 sessions, 20 hours total
Approximately 20-25 attendees each month

January 2004

Annual IPM Conference
8 hours total
250 attendees

March 2004

Propane Weed Torch Safety and Use Trainings
2 sessions, 2 hours each, 4 hours total
40 staff and other regional pest managers trained

April 2004

Earth Water and Fire Festival
Including on-site workshops on gardening and pest management, in coordination with Recreation and Parks Department
Festival: 6 hours, 200 attendees
Workshops: 2 sessions of 1 hour each, 50 trainees total

April 2004

Recreation and Parks Pesticide Use Safety Training
2 session of 4 hours each, 8 hours total
Approximately 120 staff trained

May 2004

Public Utilities Commission Pesticide Use Safety Training
2 session of 4 hours each, 8 hours total
Approximately 80 staff trained

June 2004

Approved List Workshop
6 hours total
45 attendees

September 2004

Moraga/Orinda/Lafayette IPM Training (co-organized with Parents for a Safer Environment)
Approx. 80 attendees, 4 hours

October 2004

Approved List Workshop (co-organized with Marin Co.)
6 hours total
38 attendees

November 2004

Sustainable Parks Workshop – Drought Tolerant Plants (co-organized with Rec & Parks)
4 hours total

30 staff trained

Summary of trainings - 2004

Full day trainings: 2

Half-day trainings: 6

2-hour trainings: 12

Total number of trainings = 20 trainings ranging from 2 hours to all day.

Total person-hours of trainings = 4,418 person-hours

TRAINING SESSIONS HELD IN 2005:

January – December 2005

Monthly IPM Technical Advisory Committee Meetings (see above)

2 hours each, 10 sessions, 20 hours total

Approximately 25 attendees each month

January, 2005

Goat Summit

46 attendees total, 6 hours total

February 2005

Propane Weed Torch Safety and Use Trainings

2 sessions, 2 hours each, 4 hours total

40 staff and other regional pest managers trained

March 2005

Sustainable Parks Workshop on Gopher Management

4 hours total

28 staff trained

Propane Weed Torch Safety and Use Trainings

2 sessions, 2 hours each, 4 hours total

40 staff and other regional pest managers trained

April 2005

Recreation and Parks Pesticide Use Safety Training

2 session of 4 hours each, 8 hours total

Approximately 120 staff trained

May 2005

Public Utilities Commission Pesticide Use Safety Training

2 session of 4 hours each, 8 hours total

Approximately 80 staff trained

June 2005

Annual IPM Conference

8 hours total

212 attendees

Summary of trainings - 2005

Full day trainings: 2

Half-day trainings: 5

2-hour trainings: 14

Total number of trainings = 19 trainings ranging from 2 hours to all day.

Total person-hours of trainings = 3,544 person-hours

Community, Regional, and National Outreach

Web Site: The IPM section of the website is the most commonly visited part of the Dept. of the Environment web site (www.sfenvironment.org), and people tend to go directly to the pests section. The website is used to assist City Departments and the public with new information on such topics as bed bugs and the West Nile virus, and has links to other useful web resources.

Urban Pesticide Committee: IPM Program staff actively participated in meetings of the Urban Pesticide Committee, an interagency group organized by the Regional Water Quality Control Board to address pesticide runoff issues.

Making IPM Mainstream Technical Advisory Committee: IPM staff were invited to sit on this committee, which advises a state-funded pilot project for certifying IPM structural pest control contractor services. The certification, called "EcoWise®," was recently launched in the Bay Area.

Consultations with Other Agencies: IPM staff receive frequent phone calls from local agencies seeking advice in establishing IPM programs, experience with various techniques, and other topics. In addition, staff have participated in more substantive meetings and workshops outside of San Francisco, most notably:

Moraga, Lafayette, and Orinda, CA (2004) - IPM staff helped organize and present a half-day training for City staff in these communities, which are in the process of adopting IPM policies.

Contra Costa County (2005) – SFE staff testified twice at Commission and Board of Supervisors meetings regarding IPM programs.

Westchester and Suffolk Counties, New York; New York City, NY (2005)– Representatives from these three jurisdictions funded the SF IPM program manager to attend a series of meetings aimed at improving their IPM programs. Suffolk and Westchester Counties have programs patterned after San Francisco's; New York City passed its first IPM law in late 2005.

Written Materials

- *Gopher trapping fact sheet*: A summary of techniques covered during the October Sustainable Parks Workshop on gopher management, in coordination with Recreation and Parks Department.
- *It! Guides (Control It!, Grow It!)*: SFE continues to work with PUC to make sure the It! Guides (Control It!, Grow It!, etc...) are available to interested people through our EcoCenter and at other community events.
- *City IPM Newsletter*: Members of the IPM TAC requested that SFE create a citywide newsletter that publicizes the IPM Program to City employees. Newsletters reach additional staff members not able to take advantage of the SFE TAC meetings, training and conferences. So far, three newsletters have been distributed.
- *Fight the Bite: More Important Now Than Ever* article for neighborhood newspapers.
- *Bedbug Factsheet*: Created at the request of the San Francisco Housing Authority, with assistance from the citywide pest control contractor.

Radio and Television Interviews

- *KPFA Interview (2005) Terra Verde with Pratap Chatterjee* SFE staff were special guests on this program that focused on the SF IPM Program.
- *"Discoveries and Breakthroughs in Applied Science"* interviewed SFE staff for a nationally syndicated TV segment put out by the American Institute of Physics. (www.aip.org/dbis). The topic was turfgrass IPM for golf courses and residents

Outreach Materials Update

The IPM Program has also updated some of our outreach materials for distribution at the Flower and Garden Show, Household Toxics Collection days, Recreation and Park plant sales and outreach events, and to school children through our school education program. Materials recently developed:

- *"Chip Clip"* to seal up food bags
New Message: "Seal Your Snacks – Crumbs Attract Pests".
- *Bookmark with seeds to grow plants attractive to beneficial insects*
New Message and Improved Design: "It's a Bug Eat Bug Bookmark" and "Spraying kills the good bugs too", plus basic good bug I.D.

Notes on Pesticide Use Data

The trends noted in this report are drawn from pesticide use data collected by the big seven City departments and the Citywide pest control contractor since the passage of the Integrated Pest Management Ordinance in 1996. Below are some important notes on the data.

Tier Rating System

The tier rating system was not implemented until 1999, when we evaluated all products in use at that time. Tier I product use may therefore be underreported previous to 1999, since those are the products we were most likely to eliminate in the first years of the program. For this reason, we have only analyzed data collected since 1999 when evaluating Tier levels.

Some Data is Excluded

The numbers reported throughout this report exclude the use of Bioweed and Suppressa herbicides/mulches, because these products are composed entirely of corn gluten meal, a food grade ingredient that is 100% non-toxic. The use of these Tier III products requires unusually large quantities of material, which would skew the graphs if included. Bioweed was used only in 2000 before its use was discontinued (the large amounts needed were not feasible). The use of Suppressa has likewise declined.

Rodenticides are Presented Separately

Rodenticide use is presented separately from other pesticide data due to both their public health importance and their unusually small amount of active ingredient. Though most rodenticide active ingredients are of moderate to high toxicity, they are always contained in an edible bait/attractant base and comprise only 0.01% to 0.005% of the entire product. Including these food-grade attractant ingredients would misrepresent the amount of total pesticide use; hence, the presentation in separate graphs.

Important Factors to Consider in Analysis

The goals of the SF IPM program are to effectively manage pests, emphasize prevention and non-chemical controls, and in so doing to reduce both the amount and toxicity of pesticides used. However, measuring the success of an IPM program is a complex task. Before drawing conclusions from pesticide use statistics, it is important to consider these factors:

- **Long-term trends are more important than short-term.** Pesticide use always varies somewhat from year to year due to weather, pest pressure, special renovation projects, or other factors. A change in pesticide use from the previous year does not necessarily indicate a long-term trend.
- **Exposure potential is as important as toxicity in determining risk.** A key aim of a pest management program is the reduction of risk. Risk is primarily determined by two factors: Toxicity (for example, how much chemical is required to impair a human or other animal) and exposure (for example, how much of the chemical is likely to actually reach a human or other animal). This means that the formulation and use of the products is all-important. For example, pesticides applied as aerosol sprays have much higher exposure potential—and therefore pose a greater risk—than pesticides encased in tamperproof bait boxes.
- **Pounds and gallons used can be deceptive.** Use statistics expressed in pounds and gallons mask specific products used, and do not necessarily reflect levels of risk posed by pesticides. For example, some products—such as elemental sulfur fungicide, or corn gluten meal—may be relatively nontoxic, but require high application rates to be effective. Another factor not illuminated by overall use statistics is the varying amount of active ingredient (ai) in different formulations. For example, Vanquish (active ingredient=dicamba 57%) and Proturf New KOG Weed Control (active ingredient=dicamba 0.7%) both contain the same active ingredient, but Vanquish is a concentrate.
- **Administrative/budget impacts are also important.** Increases in the number of buildings or outdoor acres maintained, decreases in landscaping staff, or underfunding can increase the pressure for “quick fix” pesticide spraying, instead of long-term, preventative, IPM solutions. Conversely, maintenance delayed (for example, by budgetary restraints) can lead to more serious problems in the future.

- **Ineffective pest management also poses risks.** West Nile virus transmitted by mosquitoes, allergies or asthma caused by cockroaches, and enteric diseases spread by rats are a few examples of hazards posed by pests themselves. It is important to remember that San Francisco's IPM Program has dual aims: Reduction of pesticide hazards and effective pest management.
- **These data do not represent residential or commercial pest management trends.**

Future Activities

Database improvements: Planned improvements include:

- Standardization of several fields to improve reporting
- Continue improving our ability to track pesticide use based on pounds of *active ingredient* used.
- Streamlined report generation to enable users to print out pesticide use reports required by state regulators without additional effort.
- Implementation of new web-enabled database, including training of IPM personnel.

Pesticide use data collection improvements:

- We plan to continue implementing a system where we can identify specific non-toxic actions such as sanitation, trapping, mechanical weed control, exclusion, and more.

Inert ingredients information

- We plan to increase our efforts to obtain manufacturers' data on inert ingredients.

Regional networking in IPM:

- Build on previous networking efforts with other local agencies to develop a sustainable regional IPM network. Such a network can combine efforts in organizing events and developing resources, and ultimately save time and money for its members.

Citywide Pesticide Use Trends

General trends

Table 3. Key Citywide Pesticide Use Statistics

Since the beginning of the IPM Program in 1996:

55% reduction (lbs. of product)	Total pesticide use 1996 through 2005, excluding rodenticides
72% reduction (gals. of product)	
87% reduction (lbs. of active ingr.)	Glyphosate (Roundup® active ingredient) use 1996 through 2005
66% reduction (lbs. of product)	Total herbicide use 1996 through 2005
88% reduction (gals. of product)	

Since 1999 (Beginning of Tier system):

53% reduction (lbs. of product)	Tier I (highest toxicity) total pesticide (not including rodenticides)
83% reduction (gals. of product)	

Since last report (2003):

94% increase (lbs. of product)	Total pesticide use 2003 through 2005, excluding rodenticides
89% increase (gals. of product)	
25% increase (lbs. of product)	Tier I (highest toxicity) total pesticide use 2003 through 2005, excluding rodenticides
51% reduction (gals. of product)	
2% reduction (lbs. of active ingredient)	Glyphosate (Roundup® active ingredient) use 2003 through 2005
40% reduction (lbs. of product)	Rodenticide use 2003 through 2005

General Trends: 1996-2005

Pesticide use dropped dramatically soon after passage of the IPM Ordinance in 1996, increased over the next few years through 1999, 2000, and 2001, then generally decreased since then. The early drop can be traced to the fact that the Ordinance, when first implemented, was misunderstood and widely misapplied. Many departments simply eliminated pesticide use at first, causing very low pesticide use numbers for the first year of the program. However, because the sudden decrease in pesticide use was not replaced with other management efforts, pest populations (weeds, insects, and vertebrates) built up over that period. Once this situation was understood, IPM Program staff worked with City staff to explore less-toxic products and

alternative techniques that could effectively control pests. Hence, the increased pesticide use between 1997 and 1999 reflects an adjustment period when City staff brought runaway pest populations back under control, while adapting and developing less-toxic techniques. Because we did not track pesticide use before the ordinance, we cannot know if the increase reached back to previous levels or remained lower than in the past.

As the program has grown and matured, we have successfully worked with pest managers to use smaller quantities of pesticide products, in more directed applications, and only when other options (such as preventive measures or cultural, mechanical, and biological controls) have been exhausted. Trial and error, along with gradual testing of new products and methods has led to the overall decrease in amount of pesticides used over the past few years. Citywide pesticide use records in San Francisco from 1996 through 2005 indicate

- A decrease in general pesticide use (Fig. 1) until 2005.
- General decrease in Tier I product use (those with the highest toxicity concerns) (Figs. 3,4) until 2005
- An increase in Tier I (most hazardous) pesticide use in 2005 due to fungicide and insecticide applications at Harding Park golf course, in preparation for the 2005 AMEX tournament (Figs. 3,4).
- Generally lower quantities used per application, with the exception of 2005. This suggests a move from broadcast to spot applications (Fig. 2).
- Leveling off of previous decreases in the use of the most popular herbicide, glyphosate (Roundup®) (Fig. 6).
- An increase in insecticide use in 2004 and 2005 due to mosquito control efforts associated with West Nile virus prevention (Fig. 7).

Highest toxicity products on the decline, except for golf courses

In general, the City is moving away from the most toxic pesticide products and is instead choosing products that are safer for the environment and public health. The use of products labeled with the signal word of Danger (greatest acute toxicity) has been totally eliminated on city property. The organophosphate insecticides diazinon and chlorpyrifos—known surface water contaminants that are the subjects of numerous federal and state pesticide reduction programs—have been completely eliminated in City operations. Perhaps most impressively, *the City does not use pre-emergent herbicides* except for a few extremely specialized uses, such as airport runways or (temporarily) around new plantings in median strips.

Other than rodent control (discussed below, see *Rodenticide Use*), the greatest obstacle to reducing the City's use of Tier I products is golf. The high aesthetic requirements for golf courses are difficult to achieve without pesticide use, and national tournament organizations pressure City course managers to use products they would not normally apply. The 2005 AMEX tournament at Harding Park is a case in point: Fungicide and insecticide use associated with the tournament almost doubled the City's use of Tier I products.

Structural pest control

This year's list of pest problems include ants, rats, mice, cockroaches, beetles, bees, birds, fleas, flies, spiders, gnats, mosquitoes (larvae and adult), opossum, pigeon, pigeon mites, silverfish, crickets, wasps, and yellowjackets. The majority of structural pest control (i.e. in and around buildings) is performed by the City's pest control contractor, Pestec. The exceptions are as follows:

- San Francisco International Airport - structural pest control by Applied Pest Management.
- MUNI – Coach pest control done by Donovan's Pest Control.
- Dept. of Recreation & Parks – some cockroach and ant control by staff.

Prevention, monitoring, and non-chemical control options are the core of a true IPM program. In the case of San Francisco's structural IPM, more than half (52%) of Pestec's visits in 2004, and about 63% of the 2005 visits, did not require application of a pesticide. This percentage has decreased over the past several years due largely to Pestec's increase in mosquito and rat management efforts. The MUNI coach pest control data is incomplete. We are currently seeking out the missing data for inclusion in the 2006 report.

Rodenticide use on the rise due to more concerted control efforts

Rodenticide use is one category of pesticide use that has *not* decreased since the inception of the IPM program. Rodenticide use began increasing in 1998, peaked in 2001, and has been slowly decreasing since then. This pattern is due to renewed efforts to control long-standing rodent problems. Rodenticides are the only feasible means for controlling rats in sewers, short of replacing the old brick sewers completely. Therefore, rodenticide use is more a reflection of political will and budgetary allocations for rat control than a sign of increased rat populations or failed preventive efforts.

However, it should be noted that monitoring remains a valid option for lowering rodenticide use, even in sewers. Pestec has been using nontoxic rat bait wired under manhole covers to detect rat presence before introducing toxic bait. This has allowed them to reduce the total amount of rodenticide used.

Despite their low percentages of active ingredients, rodenticides have concerns over secondary toxicity, that is, hazards to non-target predatory animals consuming dead or dying pests. For this reason, the City has now phased out (as of 2006) the use of products with active ingredient brodifacoum, a rodenticide with particularly high secondary toxicity concerns. A similar product, difethialone, is still used on a limited basis in the City.

It is possible that rodenticide use will increase again with the Department of Public Health's heightened attention to rat infestations. We may expect a further increase in pounds of rodenticide used if lower toxicity products (administered through multiple feedings instead of single feedings) are used instead of brodifacoum or difethialone. We consider this to be a good tradeoff, as it decreases the risk of secondary toxicity to non-target predatory animals.

Table 4. Top rodenticide products used in 2004 and 2005

Product	HazTier	Active Ingredient	Act.Ing. lbs 2004	Act. Ing. Lbs 2005
Gas Cartridge	I	Sodium nitrate 53%	0	12.77
JB Eaton Top Gun All Weather BaitBlock	II	bromethalin 0.01%	0.0458	0.0353
Eaton's answer for the control of pocket gophers	II	diphacinone 0.005%	0.0121	0.0045
Maki mini block	I	bromadiolone 0.005%	0.007	0.0130
Generation mini blocks	I	difethialone 0.0025%	0.0029	0.0015
Ditrac super-size blox	II	diphacinone 0.005%	0.0039	0.0003
Eaton's all-weather bait blocks rodenticide	II	diphacinone 0.005%	0.0034	0.0029
Contrac all-weather blox	I	bromadiolone 0.005%	0.0007	0.0060
Talon G Rodenticide mini-pellets	I	brodifacoum 0.005%	0	0.0005
Weatherblok bait with bitrex	I	brodifacoum 0.005%	0.0049	0
Eaton's bait blocks rodenticide made with Bitrex	II	Diphacinone 0.005%	0.0001	0

Glyphosate (RoundUp, Rodeo) use levels off as alternative methods increase

The herbicide glyphosate has gained a high profile due more to its overuse than to its actual toxicity. The wholesale use of the product on genetically engineered, glyphosate-resistant crops has made "Roundup" a household word. However, the downstream effects of such high-volume use—particularly on aquatic ecosystems—are still unclear, and the precautionary principle suggests that safer weed control methods should be used whenever possible. We consider glyphosate separately both because of its celebrity and because it is the most commonly used pesticide in San Francisco.

The use of dry formulations has accounted for a relatively minor portion of total use, although City staff, especially in the Recreation and Parks Department, are increasing their use of the dry product due to toxicity concerns related to inert ingredients in the liquid version. Additionally, the solid formulations can help to decrease spills, reduce the difficulty of cleanup, and reduce worker exposure due to splashing and contamination of container covers.

San Francisco has experienced a consistent downward trend in the use of glyphosate products in general, which has decreased by 87% since 1996 (lbs. of active ingredient – see Fig. 6). Much of the decrease in glyphosate-containing products is due to staff moving away from broadcast applications and increasing spot applications. Additional strategies that have contributed to this decrease in glyphosate use include: the use of weed barriers and bark mulches to inhibit weed growth; improvements to plant health to out-compete weed species; increases in hand weeding, weed whacking, and mowing to control vegetation; re-evaluating and decreasing pesticide use in areas where weeds are present but do not need to be controlled; and redefining some previous weeds as "groundcover" or "ornamental". For example, English daisies were removed from park turf in the past, but are now allowed to grow as ornamentals (except on tournament golf courses, where they interfere with golfers' ability to locate errant balls). Further reductions may be possible for other uses, such as sidewalk and pavement cracks, and spot weeding in City parks.

The barriers to further reducing the use of spray herbicides include:

- Weed control in dangerous areas such as street and highway medians, where safety concerns are such that City staff must spend as little time in those areas as possible
- Additional staff time required for some mechanical controls
- Additional budget allocation for labor and materials for physical weed barriers such as installing weed barriers and caulking sidewalk cracks

Additionally, the ongoing expansion of the San Francisco International Airport is expected to increase herbicide in coming years (see "SFIA" section of this report for more information).

Mosquito management on the rise

The San Francisco Dept. of Public Health (DPH) and SF Public Utilities Commission dramatically increased mosquito management efforts in 2004 and 2005, in preparation for the arrival of West Nile virus. The first virus-infected birds were recorded in San Francisco in the summer of 2005. DPH assembled mosquito management plans for City departments, in conjunction with the IPM Technical Advisory Committee. DPH also took on the role of collecting citywide data on infected birds and human cases. The citywide pest control contractor, Pestec, was primarily responsible for applying mosquito larvicides to approximately 20,000 catch basins throughout the City, as well as various other areas of standing water. To accomplish this daunting task, Pestec hired and trained bicycle messengers to do the actual application (which consisted of dropping a soluble plastic packet of Altosid into the storm drains). They also developed a global positioning database to keep track of these treatments. The increase in mosquito management can be seen in Fig. 7.

Table 5. Mosquito Larvicides Applied to CCSF Property by San Mateo County Mosquito Abatement District

	2004	2005
SF International Airport		
Altosid XRG 1.5%	20 lbs	1520 lbs
CG Vectolex	880 lbs	1440 lbs
Golden Bear Oil 1111	25 gals	103 gals
Vectobac 12AS	3.7 gals	40 gals
Altosid briquettes 8.6	0	13 briquettes
Altosid XR briquettes 2.1	0	8 ozs (4 briq)
Altosid 4.25 pellets	0.3 lbs	2 lbs
Altosid liquid larvicide, 20%	0	1 gal
Altosid liquid larvicide, 5%	1 gal	1 gal
Teknar HPD	3 gals	0
Sharp Park Golf Course		
CG Vectolex	1440 lbs	3600 lbs
Altosid XRG 1.5%	50 lbs	720 lbs

Because the City and County of San Francisco lacks a mosquito abatement district, neighboring San Mateo County mosquito abatement district assists us by offering free *Gambusia* mosquito fish to all SF residents. Because CCSF owns land in San Mateo County, that land is subject to the vector control requirements of San Mateo County. SMCMD therefore applies larvicides to CCSF properties within their county lines as well as to properties bordering their county, which they see as impacting their vector control jurisdiction. Much of this is in the form of helicopter larvicide applications to inaccessible wetland areas. Below are the applications made by SMCMD to CCSF properties in 2004 and 2005. The vast majority are microbial based, Tier III products.

Citywide Pesticide Use Graphs

Figure 1.

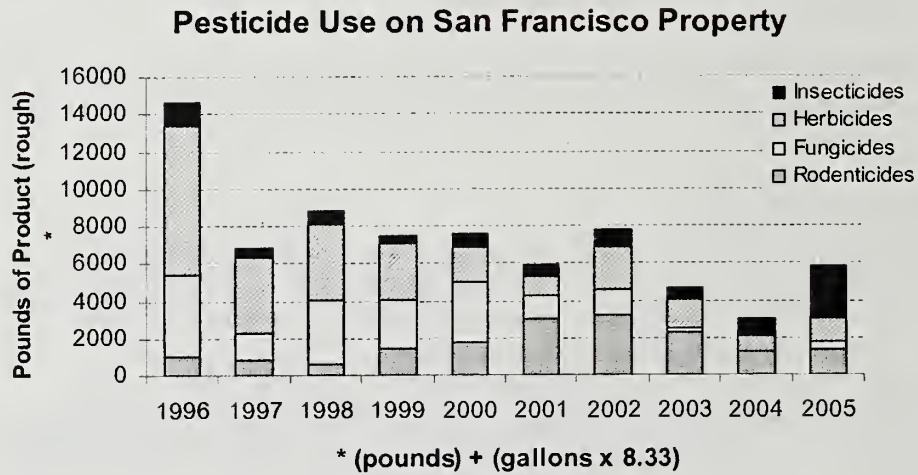


Figure 2.

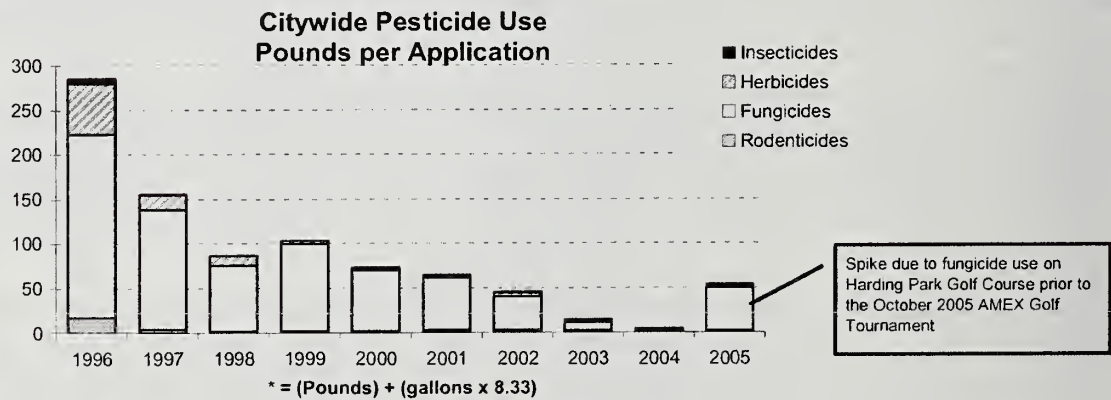


Figure 3.

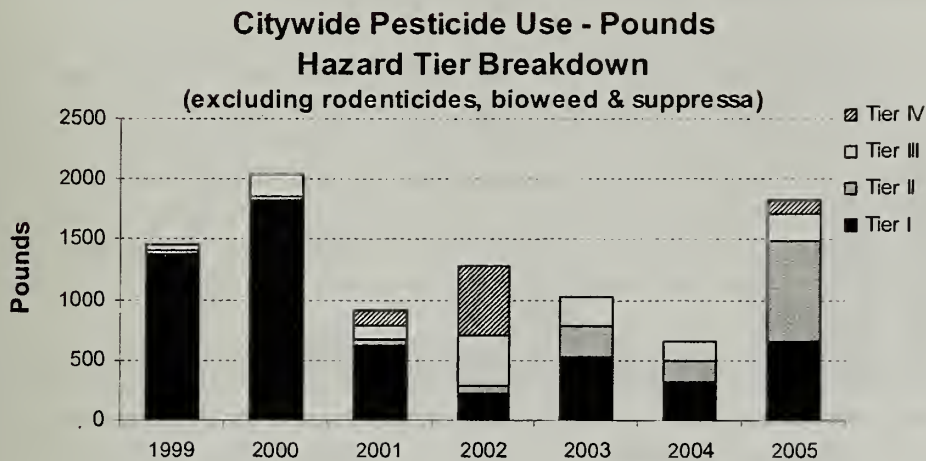


Figure 4.

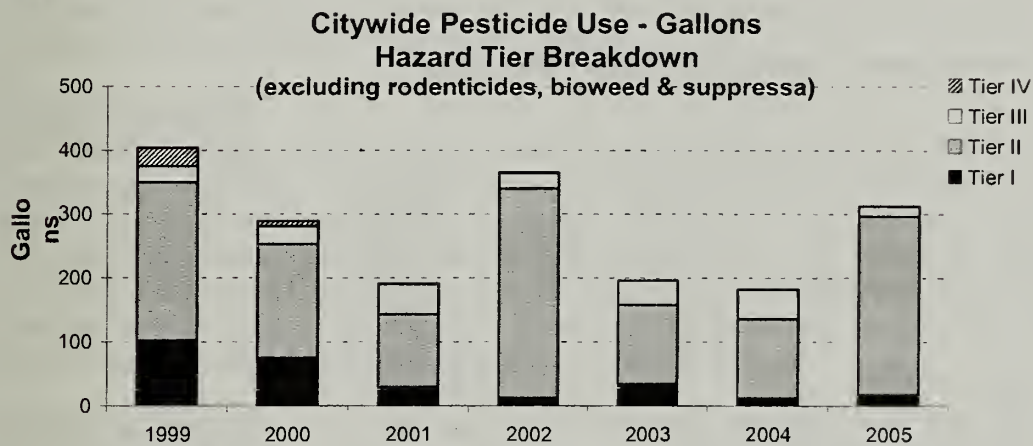


Figure 5.

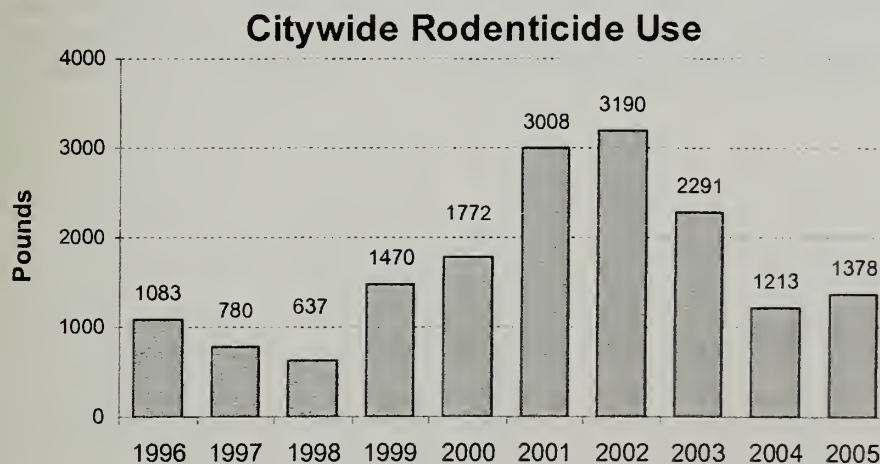


Figure 6.

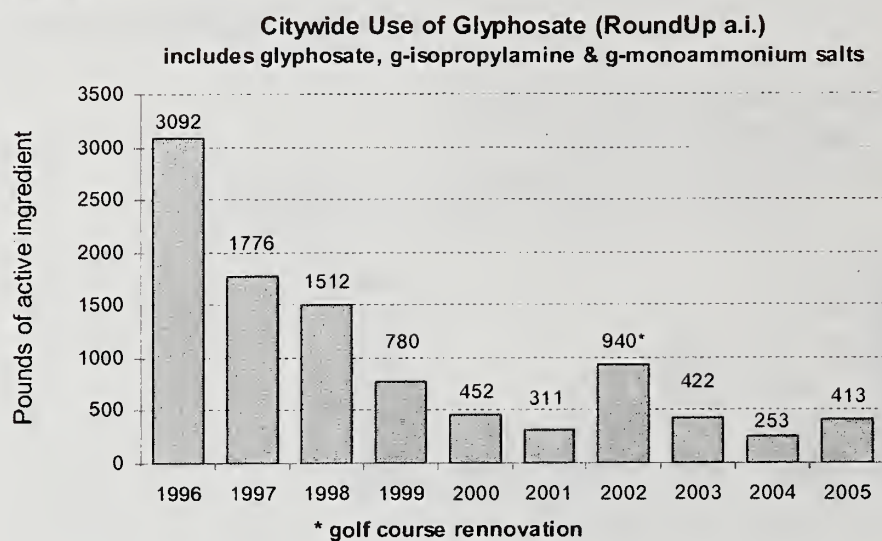
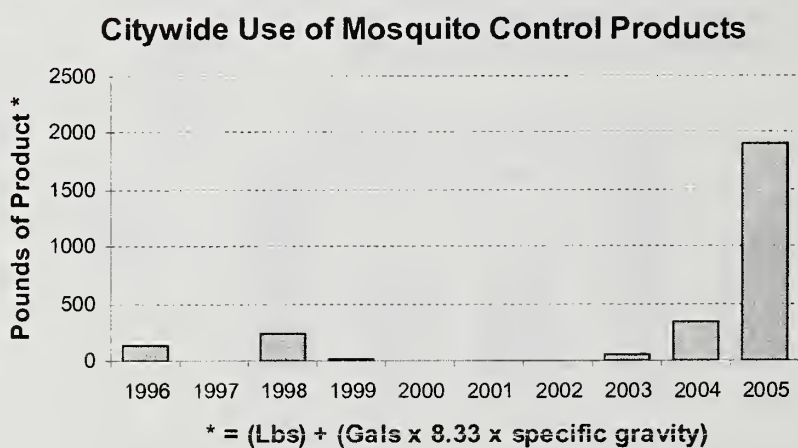


Figure 7



Department of Public Health

Through 2005 SFE continued to facilitate cooperation between DPH and other City departments to address the concerns of mosquito management and West Nile Virus prevention. SFE teamed up with DPH and PUC to form a West Nile Virus Outreach Committee, launching a concerted city-wide campaign to raise awareness about West Nile Virus prevention and detection in 2004 and 2005. Laguna Honda Hospital has been actively using IPM during the preconstruction phase of remodeling. A coordinated IPM and Green Building effort continues, and has expanded to include specifications for pest prevention in the new buildings.

Trends in Toxicity and Amounts Used:

The quantity of Tier I products used by DPH, excluding rodenticides, has decreased steadily to almost none in 2004, whereas the use of tier II and tier III products is on the rise due to increased mosquito control efforts (Figs. 9, 10). With DPH's increasing attention toward mosquito management, further increases are expected. Liquid pesticide products (ie: sprays) have seen a dramatic and consistent decrease over the history of the program to almost none in 2005. Dry formulation pesticide use is on the rise due to increased mosquito abatement efforts. Roundup use remains at zero (Fig. 12), as much of the landscaped areas surround the hospitals, where pesticide use is minimized to protect patient health.

Rodenticide Use:

Rodenticide use has remained relatively stable over the past several years with a slight decreasing trend (Fig. 11). DPH has moved from using the Tier I Weatherblock baits, containing active ingredient brodifacoum (0.005%), to predominantly using a Tier II rodenticide, JB Eaton Top Gun Rodenticide, with active ingredient bromethalin (0.01%). This is a positive trend, considering the recent elevated secondary toxicity concerns associated with brodifacoum. These products have large amounts of inactive, food attractant ingredients causing their total weight to be very heavy compared to the amount of active ingredient used.

Mosquito Control:

Increase in pesticide use in recent years is due mainly to elevated mosquito control efforts. DPH has a cooperative agreement with the California State Department of Health Services for mosquito control throughout San Francisco. With the spread of West Nile Virus to the Bay Area, their responsibilities have increased. In addition to other city departments taking part in mosquito management, DPH is also increasing the use of mosquito larvicides. Documentation of this use has been minimal in the past, and accurate tracking only began in 2003.

Department of Public Health - Pesticide Use Graphs

Figure 8

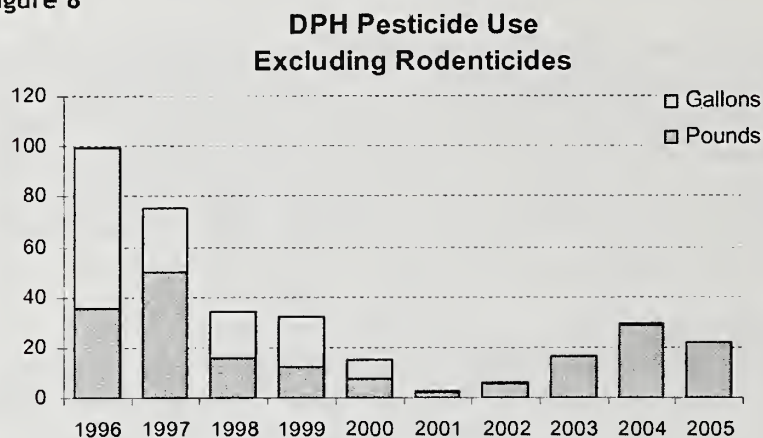


Figure 9.

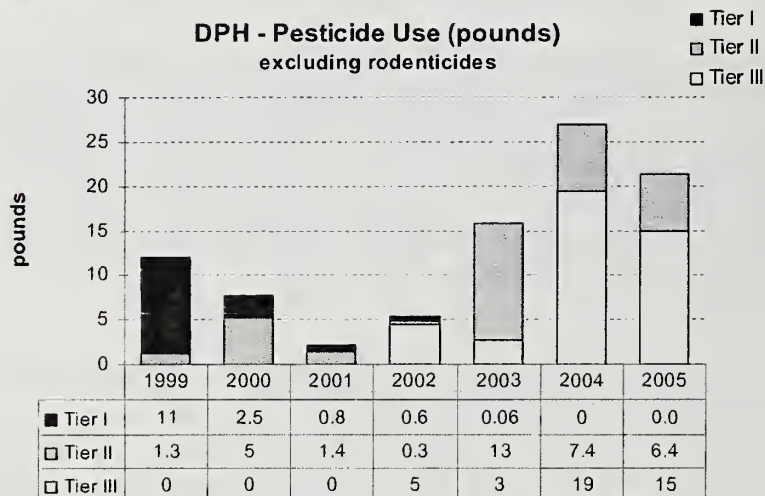


Figure 10.

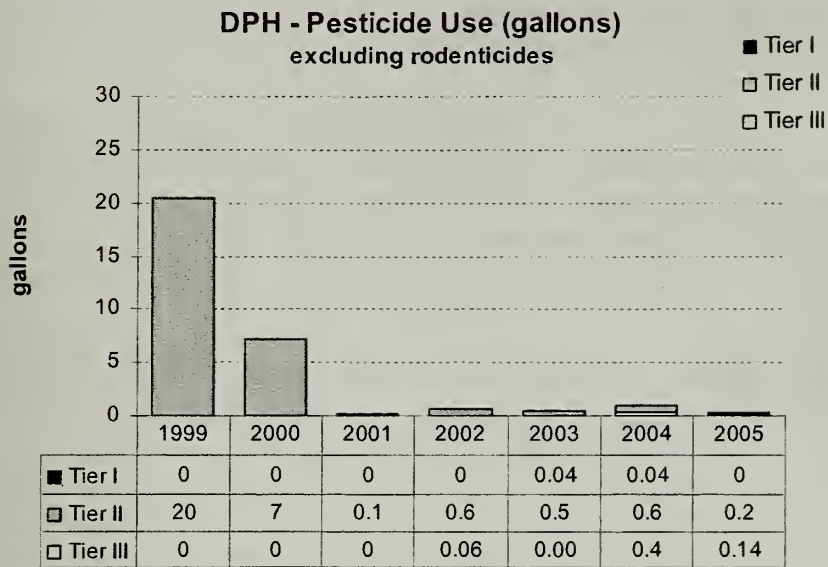


Figure 11

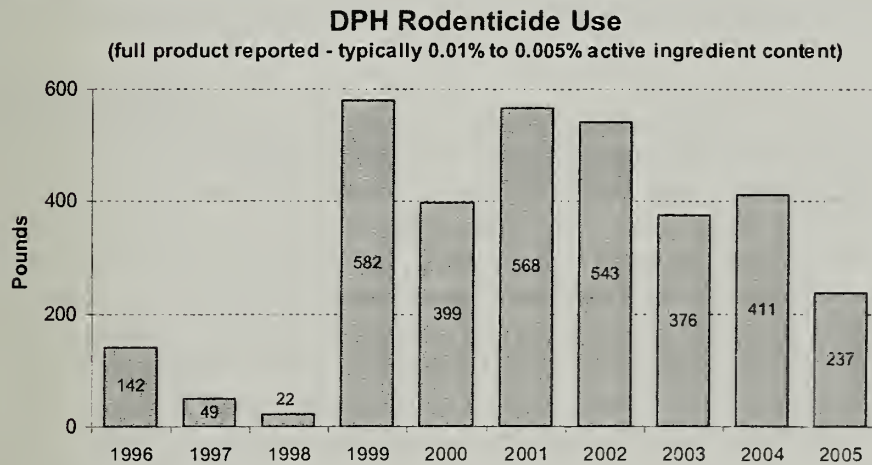
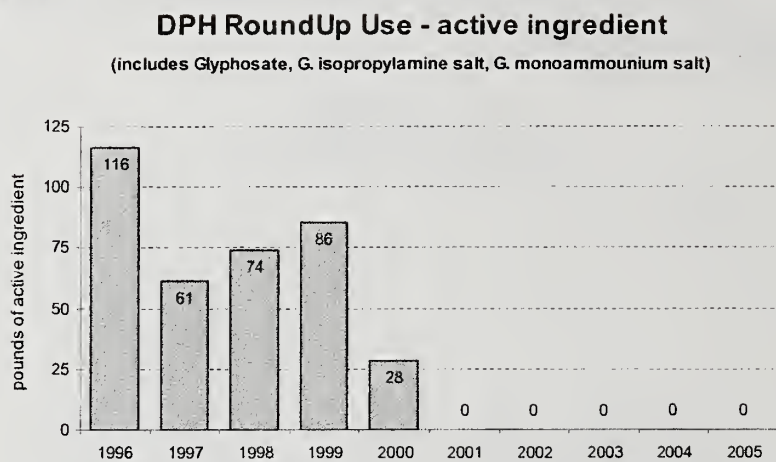


Table 6. Department of Public Health Rodenticide Use (amount active ingredient)					
Product	Active Ingridient	Hazard Tier	2003	2004	2005
Weatherblok bait with Bitrex	Brodifacoum 0.005%	I	0.3 ozs.	0.02 ozs	0
Wilco Gopher Getter Type II bait	Chlorophacinone 0.005%	II	0.0016 ozs.	0	0
JB Eaton Top Gun Rodent Bait	Bromethalin 0.01%	II	0	0.62 ozs	0.38 lbs

Figure 12



Department of Public Works

Trends in Toxicity and Amounts Used

The Department of Public Works (DPW) is a relatively minor user of pesticides in the City. DPWs use of Tier I products dropped to zero in 2005 after remaining low for several years in a row (Figs. 13, 14, 15), while Tier II product use increased in 2004 and 2005 (see section below, *Roundup Use*). No Tier III product use has been reported.

Rodenticide Use

In 2004 the Department of Public Works launched a Rat Abatement Campaign focused on the most heavily infested parts of the city where old sewer pipes encourage rodent movement and activity. Representatives from DPW, DPH, PUC, and SFE gathered weekly for several months to assess the resources needed to reduce sewer rat populations. The final determination was that a large amount of resources are required to effectively address the rodent population. Sewer and street infrastructure areas which encourage rodent movement and access to food would need to be repaired and much education regarding food and waste management is needed. The problem can not be tackled without the complete cooperation of City agencies and the commercial and residential sectors.

Though DPW use of rodenticides is low in 2005, sewer baiting and other rat abatement efforts continue and are reported mainly in the PUC and DPH sections of this report.

Herbicide Use

In 2004 DPW hired gardening staff licensed to spray herbicides. This was a positive step, as several areas maintained by DPW are too dangerous for hand-weeding or other time-consuming methods. Such areas remained in a state of neglect while the department lacked staff to safely maintain these areas. For example, narrow street medians present a hazard to workers; hand-weeding is time consuming and gardeners should not be exposed to this risk for any longer than necessary. In the past some test medians were planted with wildflowers as a possible solution; weeds grew through the wildflowers and presented an increased management challenge. Weed whacking is likely to kick up rocks and break windows of nearby cars or buildings. Yet, for road safety weeds must remain low enough to not present a traffic hazard by blocking line of site to other traffic. It is therefore a positive step that DPW resumed use of Roundup in 2004 for these challenging locations.

SFE and the City IPM Consultant worked with DPW to develop an IPM Demonstration Pilot Project to showcase the use of weed fabric, bark mulch, and xeriscape plants in median strips and sidewalk plantings. Two years after installation, project areas remain healthy and meet meridian vegetation requirements. However, the resources needed to maintain these areas are greater than expected mostly due to weeds growing in the mulched areas. As the bark mulch decomposes it creates a fertile bed for weeds, and the amount of sun hitting the ground between small new plants further encourages weed growth. Soon the decomposed mulch will need to be removed and replaced with new mulch, and this will need repeating every few years. The large amount of time and materials required to install these areas, combined with their increased maintenance over time and eventual need for overhaul or replacement has created concerns. DPW does not know if they can continue to allocate the needed resources over time to maintain these areas.

Department of Public Works - Pesticide Use Graphs

Figure 13.

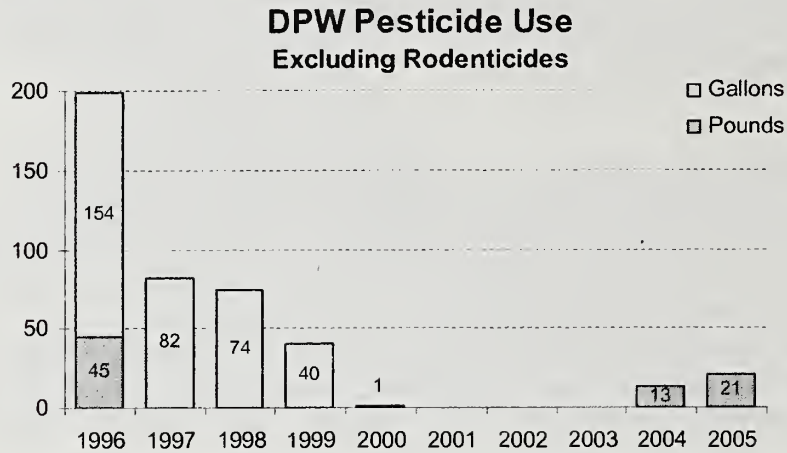


Figure 14.

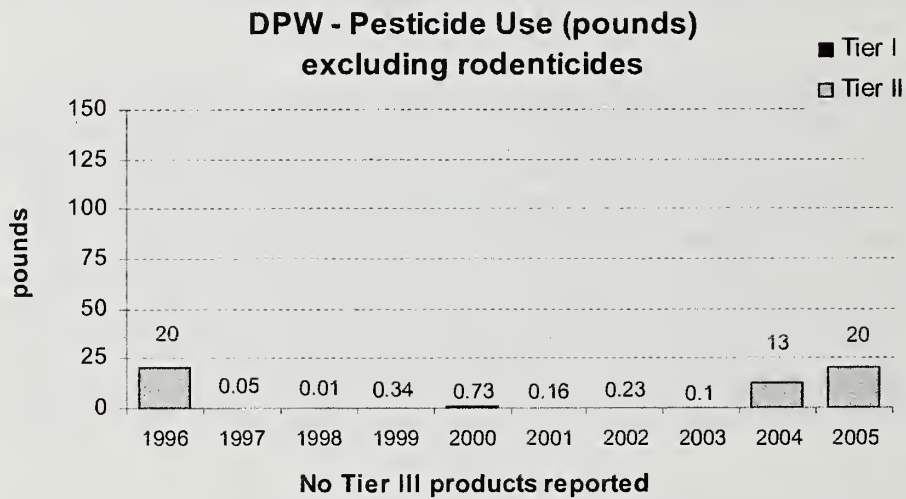


Figure 15.

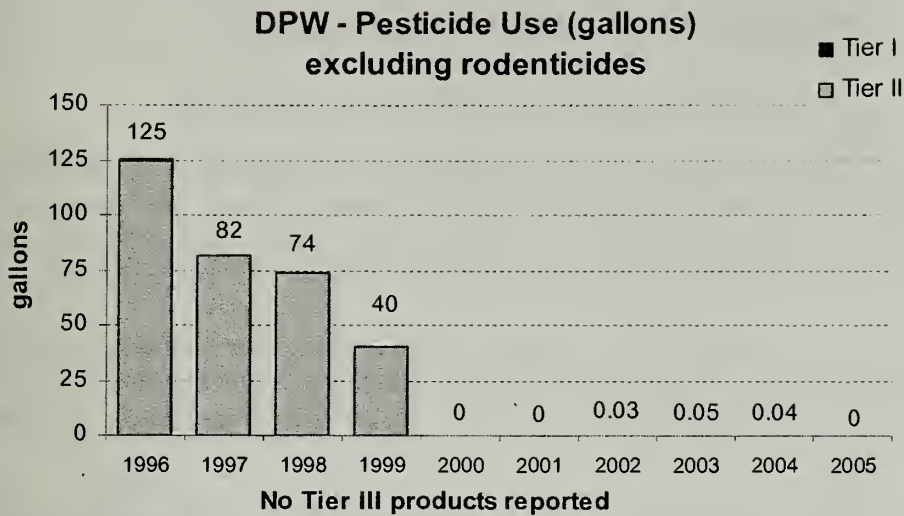


Figure 16.

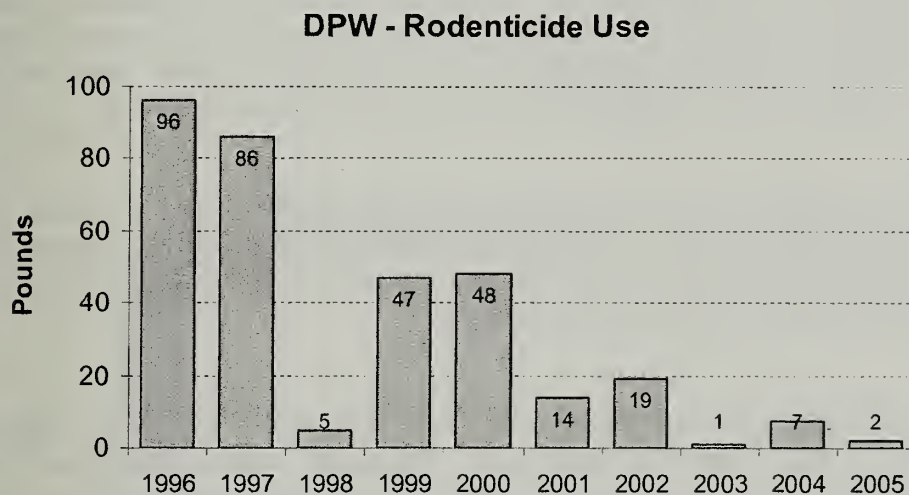
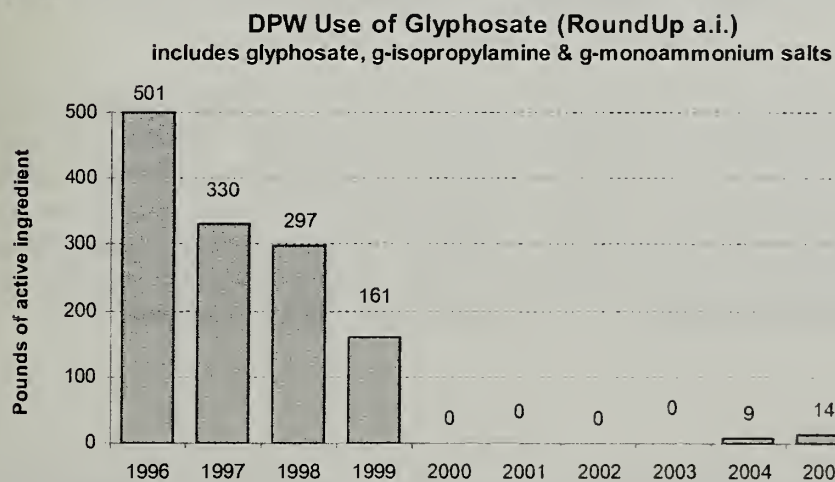


Figure 17.



Department of Transportation (MUNI)

Trends in Amounts Used

SF MUNI has successfully implemented IPM techniques in their facilities with pesticide use remaining low compared to other departments. Muni lost both of their gardeners/pesticide applicators to retirement in 2004 and did not have any landscaping staff in 2005, creating deferred maintenance that we expect to result in elevated herbicide use in 2006 and 2007.

Application of liquid/spray formulations has declined consistently since the beginning of the IPM program and remains close to zero (Fig. 19). Dry formulation use has remained low, with a slight increase in 2005 (Fig. 20) due to the use of some Roundup on the rail tracks and increased mosquito control efforts on MUNI property.

The pest control company that services the SF MUNI busses and rail coaches has not been reporting pesticide use to the Department of the Environment for several years now. We are working with them to supply this information for all past years and on setting up a system by which they will regularly report this information in the future. Therefore, the figures reported here do not include pesticides (mainly ant and cockroach baits) used in the coaches. Adding these figures to next year's report is expected to increase MUNI's overall pesticide use significantly. Structural applications are made by Pestec and are included in this report.

Trends in Toxicity:

SF MUNI has eliminated the use of all Tier I (most hazardous) products. Tier II products are generally low, with most use in 2005 due to Roundup use on the rail tracks and the introduction of Agnique as a mosquito larvicide. Tier III product use is on the rise due to the introduction of two biological mosquito larvicides (Aquabac and Vectolex).

Rodenticide Use:

Rodenticide use by SF MUNI remains low. In 2004 and 2005 MUNI worked to eliminate products with the active ingredient brodifacoum due to recently elevated concerns over secondary toxicity, that is, hazards to non-target predatory animals consuming dead or dying pest species. In 2004 only 2.4 pounds of rodenticide with this high-risk chemical were used (0.0001 lbs of active ingredient), and in 2005 it was entirely eliminated and replaced by the less toxic Top Gun All Weather Bait Block (active ingredient 0.01% bromethalin).

Herbicide Use:

SF MUNI uses very few herbicides overall, increasing its tolerance of weeds in some areas, and stepping up the use of weed-whackers and propane-powered weed torches in others. Occasional herbicide use is needed on the rail tracks to meet safety requirements where hand-weeding or other time-consuming measures are not feasible to maintain worker safety, and where weed-whacking poses the threat of flying rocks which damage cars and building. During the time MUNI remained without gardeners, DPW staff helped them maintain acceptable weed levels on the rail tracks with three herbicide applications of Roundup at the end of May 2005.

MUNI - Pesticide Use Graphs

Figure 18.

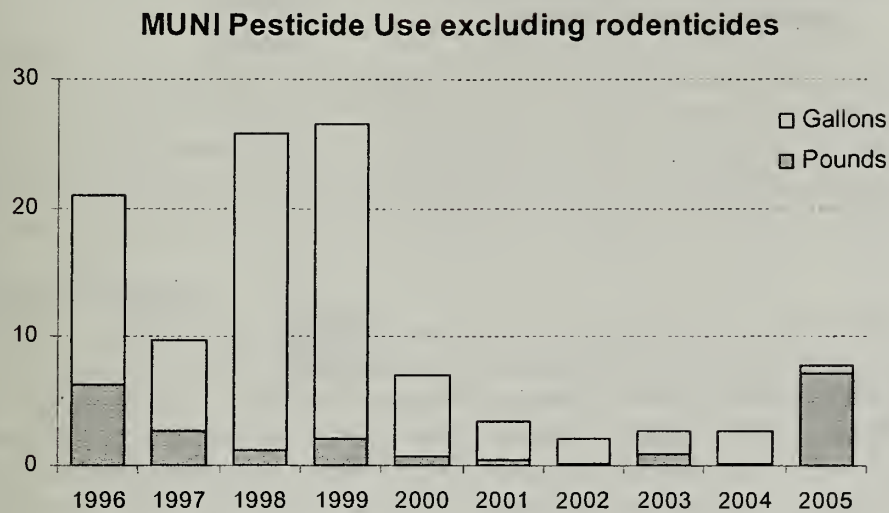


Figure 19.

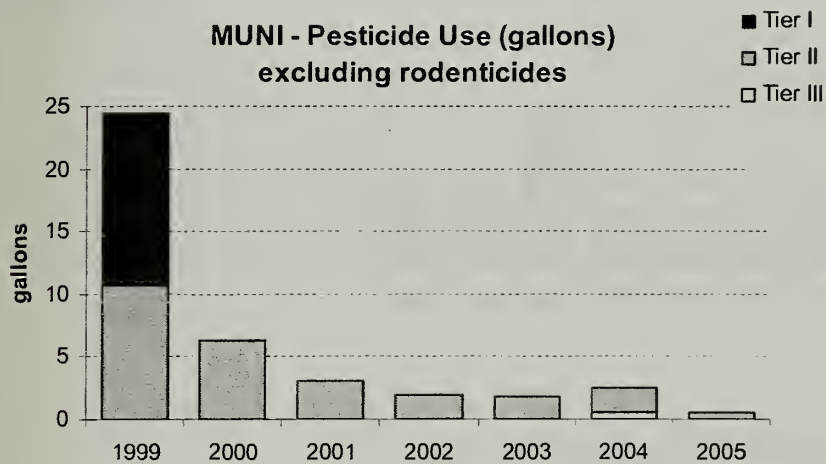


Figure 20.

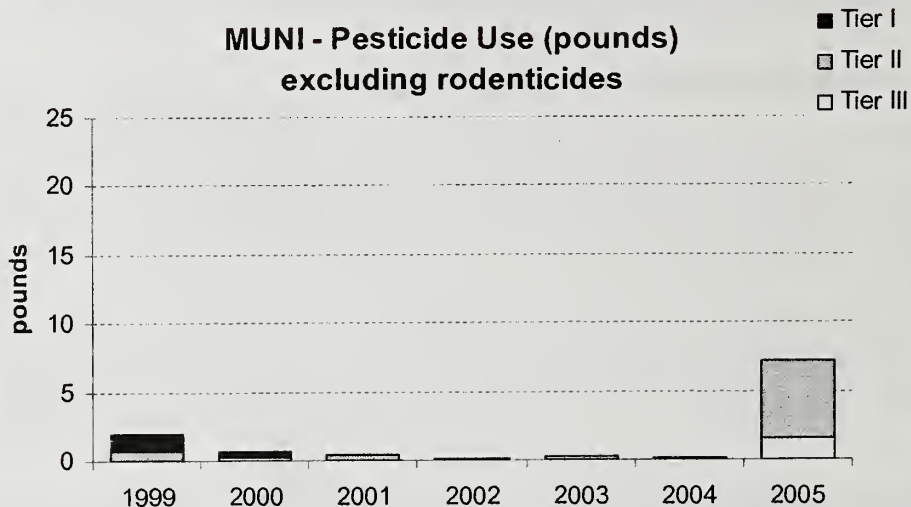


Figure 21.

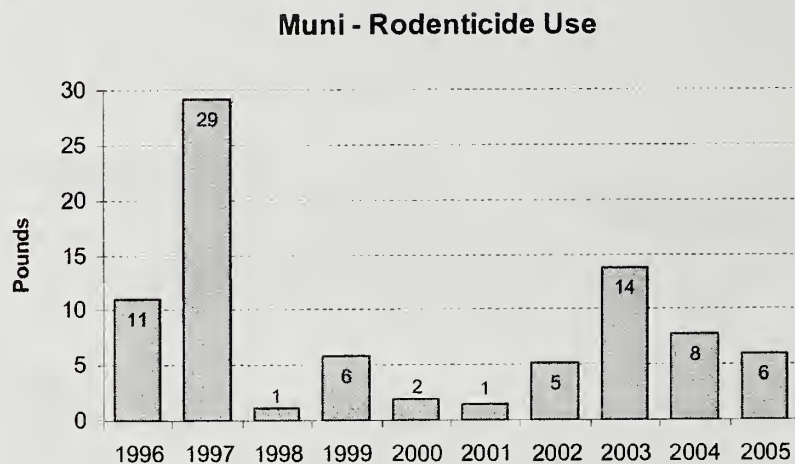
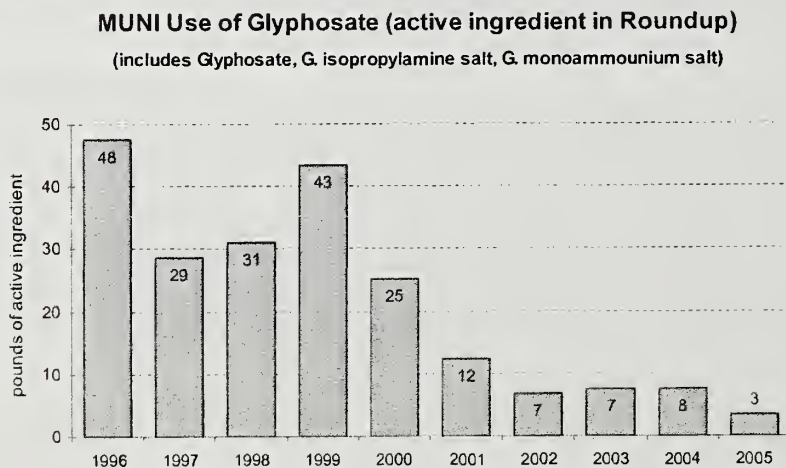


Figure 22.



Port of San Francisco

Trends

Pesticide use by the SF Port remains low (Fig. 23). The use of the most hazardous products defined as Tier I has remains at zero (Fig. 24). Tier II pesticide use (which includes Roundup herbicides) increased in 2005 (Fig. 3) (see *Herbicide Use*, below, for details). No Tier III pesticide use has been reported by the Port over the course of the program. The Port is encouraged to look into replacing the Tier II products with those in Tier III whenever possible.

Rodenticide Use

The Port has been actively and consistently managing rodents since 1996, with rodenticides accounting for the majority of pesticide use (Fig. 26) for all years except 1998 (in 1998 65 lbs of *Spike Dry Flowable* herbicide took the lead). All rodenticides are applied by Pestec, the City's main pest control contractor. Pestec also does a large amount of rat trapping at port sites. The constant public and tourist traffic in Port areas and the food and refuse left behind continues to be a source of food for local rodents, necessitating the need for constant abatement efforts. The Port has successfully eliminated the use of all rodenticides containing the active ingredient brodifacoum, a chemical with concerns over secondary toxicity. Nonetheless, to minimize secondary toxicity hazards in general, all rodenticide use on Port property is carefully placed out of the way of non-target organisms in bait boxes or in covered sewers.

Herbicide Use

The Port has not applied herbicides for many years due to lack of licensed pesticide applicators on staff. In 2005 the two Port gardeners obtained their pesticide applicator licenses, allowing them to apply herbicides in the railyards where weed control has been a long-time problem. This localized application of Roundup at the railyards caused an increase in 2005 over the previously negligible amount of herbicides used (Fig. 27). Port gardeners continue to maintain parks without the use of herbicides through the use of weed whackers, mulching, hand weeding and other mechanical methods, and using drought- and pest- tolerant plantings.

Port of San Francisco - Pesticide Use Graphs

Figure 23.

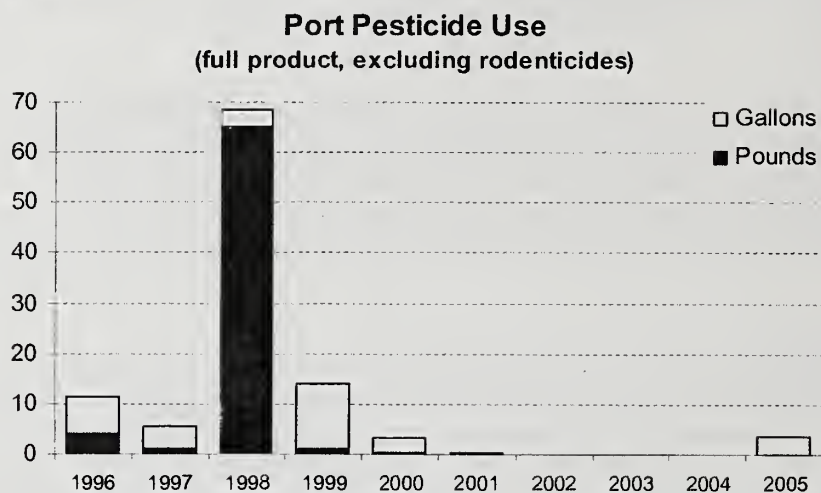


Figure 24.

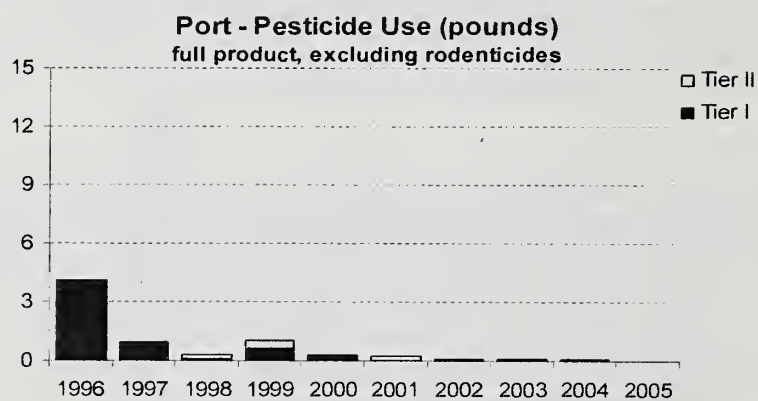


Figure 25.

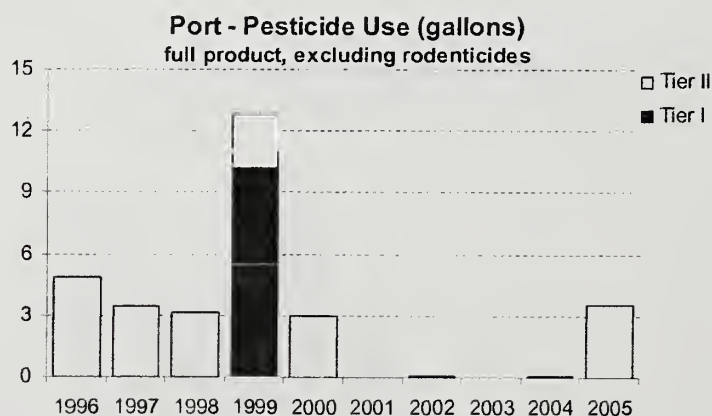


Figure 26.

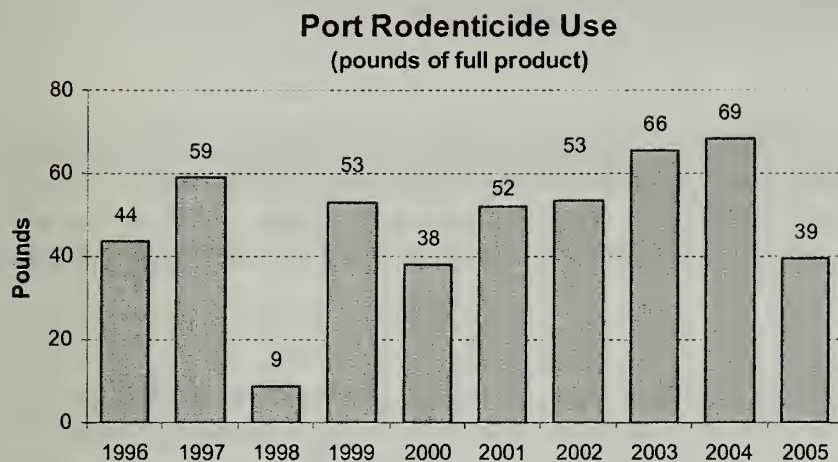
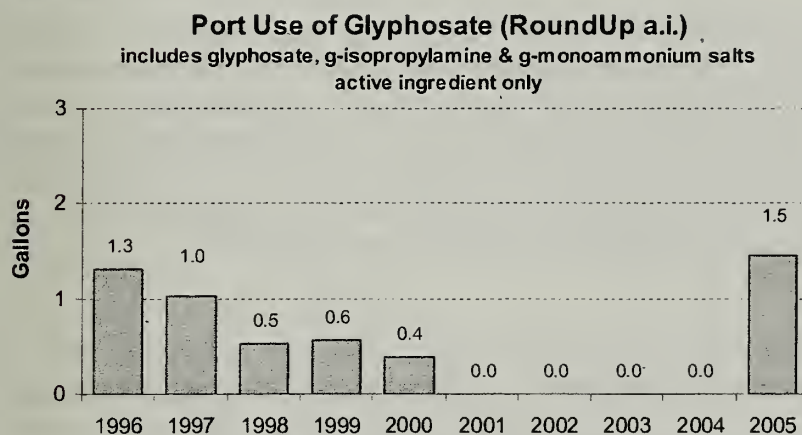


Figure 27.



Public Utilities Commission (PUC)

Trends in Amounts Used

PUC's type and quantity of pesticide use has changed over time: After dramatic pesticide use reductions earlier in the program, rodenticide use fluctuated up and down, and mosquito control products rose sharply in 2005 due to the recent large-scale mosquito control and West Nile Virus prevention program (Fig. 28). This accounts for the sharp rise in Tier II products seen in figures 29 and 30.

Trends in Toxicity

The use of the most hazardous (Tier I) products dropped to zero in 2004 (Figs. 29, 30) as PUC intentionally eliminated the use of *Weatherblok Bait with Bitrex®* (active ingredient brodifacoum), a rat control product with high concerns over secondary toxicity. Tier II products increased sharply in 2005 with the elevated use of Altosid pellets (active ingredient methoprene) and golden bear oil for mosquito larval control. Tier III products – the lowest hazard category of pesticides – are on the rise (biological mosquito larvicides).

Rodenticide Use

Rodenticide use has fluctuated since an initial drop in 1997 and remains relatively low (Fig 31). Almost half (46%) of the reported 140 pounds of product used by PUC in 2004 was used to control gophers at the Sunol Water Treatment Plant (Eaton's Answer for the Control of Pocket Gophers). In 2005, however, rodenticides only accounted for 2% of the 695 pounds of products applied. The majority of this rodenticide is food-grade-attractants. In fact, the low percent of active ingredient (0.005% diphacinone) translates to 0.0037 lbs of active ingredient used for gopher control by PUC in 2004, and 0.000085 lbs of active ingredient in 2005.

Herbicide Use:

The use of herbicides by PUC has decreased steadily to almost zero in past years (Fig. 32). Targeting the most susceptible stage of plant growth has helped the PUC to drastically reduce chemical use. The PUC continues to use goats for weed control on pipeline rights-of-way, especially in residential areas where other techniques (such as burning or herbicides) might prove objectionable. They have also increased their use of mechanical methods and propane torches for weed control. Lack of staffing resources accounted for part of the reductions, forcing the use of herbicides on an as-needed and time-available basis. The PUC has plans to tackle long-standing Yellow Star Thistle infestations in some natural areas in the next few years, so herbicide use is expected to increase in the near future.

Mosquito Control

PUC Pesticide use increased in 2005 due to large-scale mosquito control efforts. Products accounting for the increase are Altocid pellets (active ingredient methoprene) and golden bear oil, both larvicides used in the 20,000 catch basins city-wide. These mosquito larvicides accounted for 30% of the 140 pounds of whole product used in 2004, and 97% of the 695 pounds of whole product used in 2005. (Table 7). Mosquito controls have increasingly emphasized elimination of breeding habitat (standing water) and use of least-toxic larvicides when necessary with increasing focus on the treatment of the 20,000 catch-basins throughout the city. The

larvicides used by the PUC are some of the least toxic, yet most effective products available, and they target mosquitoes at their most vulnerable stage before they emerge as adults.

Table 7. Pesticide Products Used by PUC 2003-2005				
	Hazard Tier	Amnt Used 2003	Amnt Used 2004	Amnt Used 2005
Rodenticides				
Eaton's answer for the control of pocket gophers	II	20 lbs	64 lbs	0
JB Eaton Top Gun All Weather BaitBlock Rodenticide	II	0	7 lb	17 lbs
Weatherblok bait with bitrex	I	15 lbs	2 lbs	0
Mosquito Larvicides				
Agnique MMF	II	7 gals	21 gals	12 gals
Vectox G biological mosquito larvicide (Bacillus spp)	III	35 lbs	67 lbs	30 lbs
Aquabac mosquito biological larvicide (Bacillus spp)	III	0	0	50 lbs
Golden Bear mosquito larvicide oil	II	0	0	102 gals
Zoecon Altosid pellets (methoprene)	II	0	0	594 lbs
Herbicides				
Roundup herbicide	II	0	0	0.02 gals
Roundup pro herbicide	II	3 gals	2 gals	12 gals
Roundup pro dry herbicide	II	0	0	0.4 lbs
Trifluralin	II	0.75 lbs	0.1 lbs	1.9 lbs
Rodeo aquatic herbicide	II	0.4 gals	0.06 gals	0.06 gals
Turflon ester	II	0.3 gals	0.05 gals	0.04 gals
Ezject Selective injection herbicide	II	0.03 gals	0	0.2 gals
Garlon 4	II	0.06 gals	0	0.5 gals
Transline	I	0.01 gals	0	0
Other				
Terro California ant killer	II	0.3 gals	0.24 gals	2 lbs
PT 515 Wasp-freeze	II	0.3 gals	0.2 gals	0.03 gals
Target pro-spreader activator	I	0	0.02 gals	0.2 gals
Advance liquid ant bait	II	2.5 lbs	0	0
Maxforce IBF4 Carpenter Ant Bait	II	0.07 lbs	0	0.001 gals
Maxforce Professional Insect Control Granules	I	1 lb	0	0

Public Utilities Commission - Pesticide Use Graphs

Figure 28.

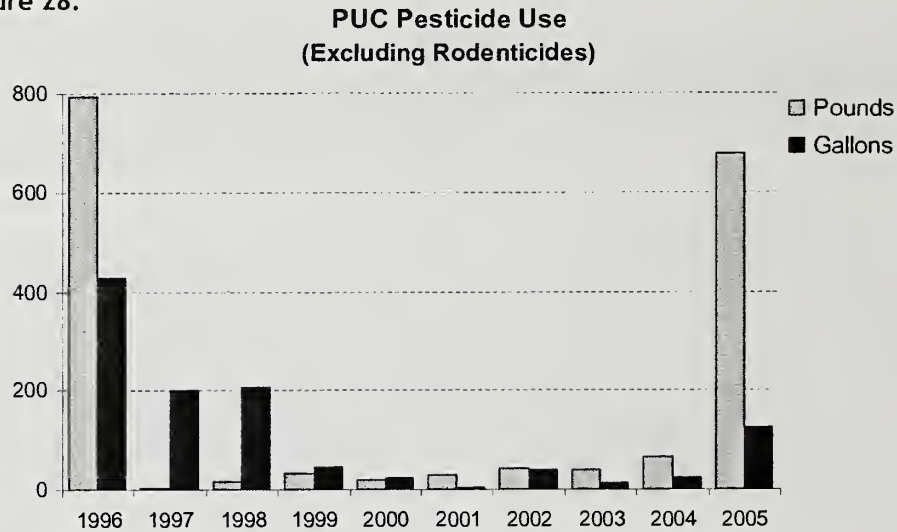


Figure 29.

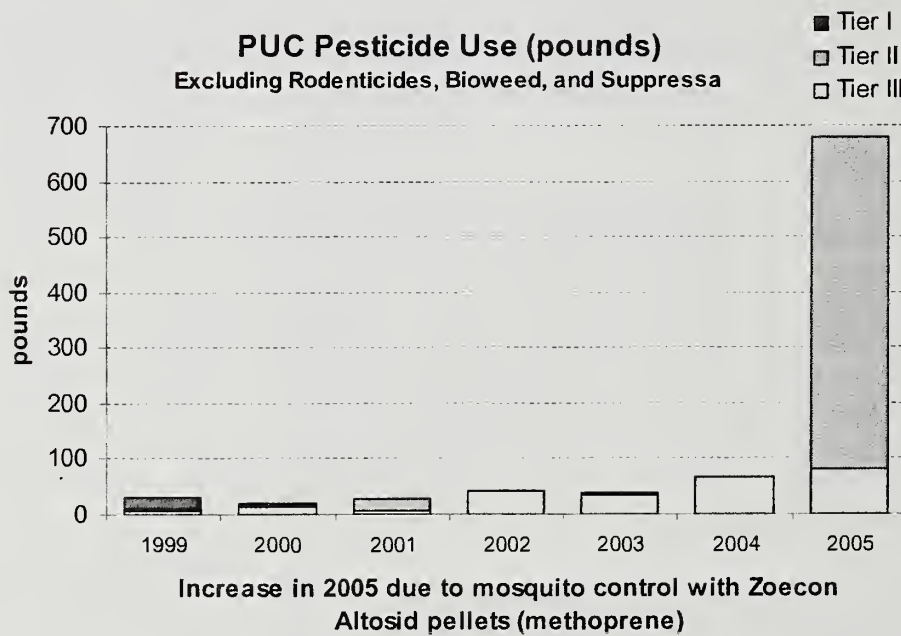


Figure 30.

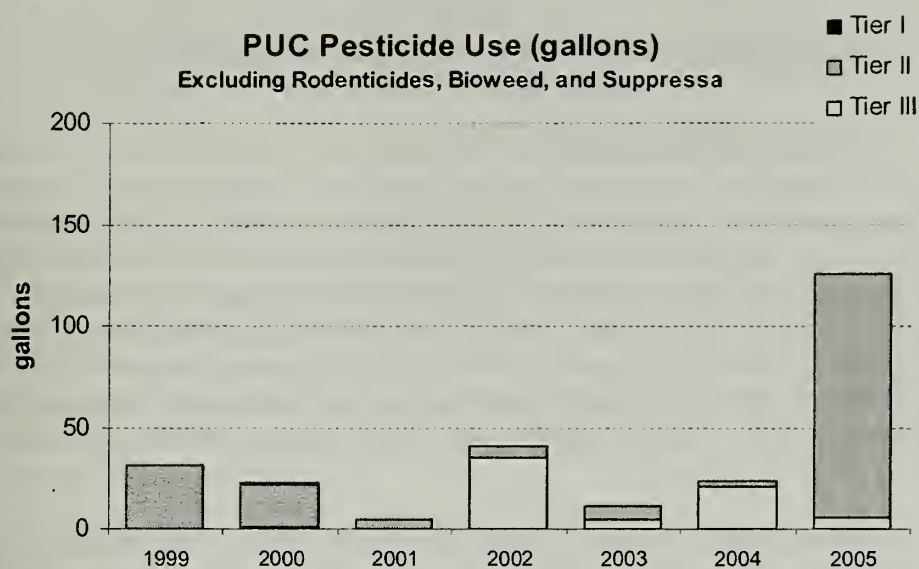


Figure 31.

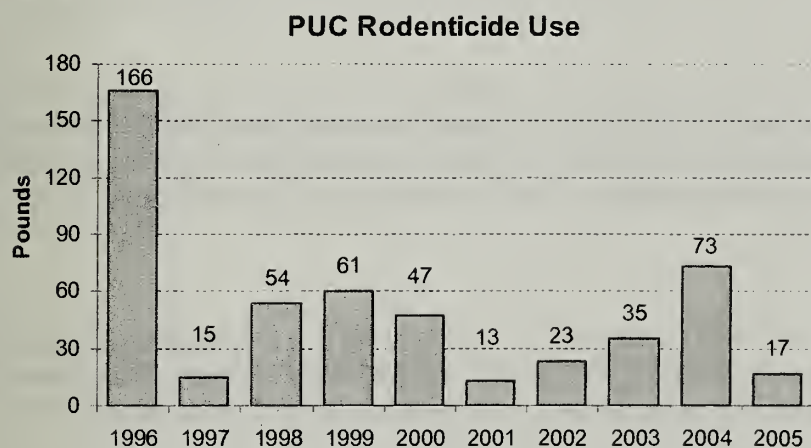
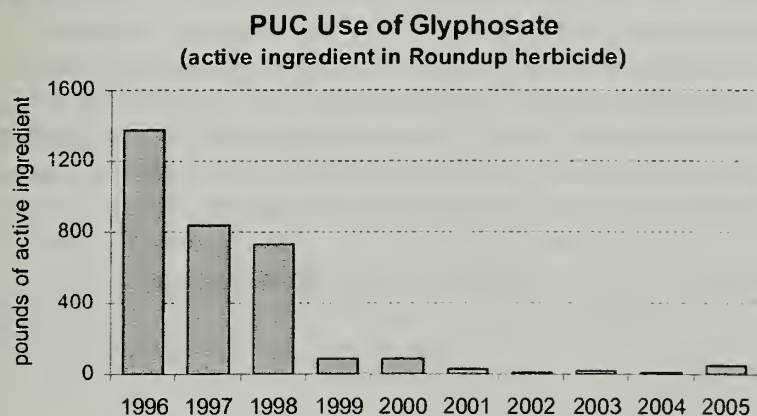


Figure 32.



Department of Recreation & Parks (R&P)

The Department of Recreation and Parks (R&P) is the biggest user of chemical pesticides in San Francisco because this department manages the largest acreage of landscaped area. There is considerable IPM expertise within the ranks of R&P: The department currently has three staff licensed as Agricultural Pest Control Advisors (PCAs), and numerous staff with Qualified Applicator Certificates. This professionalism is reflected in both the innovative projects undertaken by R&P and by the relatively low levels of pesticide use. The Rec & Park IPM Team has continued their leadership in exploring new, reduced-risk pest management methods, such as compost teas for golf greens, propane flamers to control weeds on hardscapes, modified barrier and trapping techniques for gophers, smoke bombs for ground squirrels, and reduced-rate herbicide applications for golf courses.

Recent cutbacks in gardening staff have hindered the department's ability to manage its holdings using reduced-risk methods. Physical control of weeds or installation of weed barriers, for example, are much more labor intensive activities than spraying post-emergent herbicides. Reduction in staffing therefore increases the incentive to use certain pesticides.

Trends in Amounts Used

R&P overall pesticide use (excluding rodenticides, Bioweed & Supressa) has decreased by 54% (pounds) and 70% (gallons) since 1996 (Fig. 33). There has been considerable variability in pesticide use from year to year: While 2004 use was lower than 2003 use by 43% (pounds), use in 2005 was 36% higher than 2003 in pounds, and 43% lower than 2003 in gallons.

Trends in Toxicity

R&P use of Tier I products, those with the highest toxicity concerns, has fluctuated over the years (Figs. 34,35) with an overall decreasing trend. Since the hazard tier rating system was implemented in 1999, R&P has reduced its use of Tier I products by 51% (pounds) and 55% (gallons).

Most of the increase in 2002-2003 was due to the use of Proturf New KOG herbicide on golf greens (active ingredient dicamba). The use of this product has increased sharply over the past few years as it has replaced the more concentrated Vanquish herbicide. Although Proturf New KOG Weed Control and Vanquish are both Tier I products, Vanquish contains 54% active ingredient whereas its replacement contains only 0.7% active ingredient. R&P has also been substituting the Tier II product Turflon Ester (active ingredient triclopyr) for Vanquish, or tank mixing Vanquish at a reduced rate with Turflon Ester, in a further effort to reduce overall risks. However, Vanquish is still being used for certain problematic or herbicide-resistant weeds in high profile turf – especially in preparation for the AMEX golf tournament in 2005.

In terms of pounds of product, the top five most widely used Tier I products were:

Rodenticide: *Generation Mini Blocks (difethialone)*
Insecticide: *Merit (imidacloprid)*
Rodenticide: *Maki mini-blocks (bromadiolone)*
Herbicide: *Proturf new KOG weed control*
Rodenticide: *Proturf Systemic Fungicide (thiophanate-methyl)*

A single 345 lb. application of Merit (under an SFE exemption) was made just before the AMEX golf tournament, and accounted for a large portion of Tier I pesticide use for the entire City. The justification for exempting this product, as requested by PGA Tours and R&P, was to treat crane fly larvae and cutworms – pests not normally controlled using pesticides in San Francisco. SFE and R&P intend to work with PGA Tours agronomists to eliminate the need for these applications in the future. Another two exemptions for the herbicide Vanquish were granted due to a lack of effective alternatives in controlling the weed *Soliva sessilis* at Harding Park (see herbicides section below).

Tier I fungicide use by R&P on golf courses has continued to decline (by 58% since 2003 and by 96% since 1999). This may be the result of their increased use of EM1, a microbial product, and/or compost tea applications on golf greens. (SFE and R&P intend to participate in a scientific study on compost tea effectiveness, currently being planned by the US Golf Association, which will help answer many questions on this technology.) The renovation of Harding Park in 2002-03 probably played a part in the reduction of both herbicide and fungicide use.

The use of Tier II products rose from 1999 to 2002 as the direct result of substituting Tier I products with the less toxic ones in Tier II (such as *Vanquish* being phased out and replaced by *Turflon Ester*, above) R&P's use of Tier II products remained roughly the same from 2003 through 2005.

Rodenticide Use

Rodenticide use has increased by 45% since 1996, but has decreased by 46% between 2002 and 2003 (Fig. 36). The bulk of the rodenticides are used to control gophers in athletic fields, where they pose a hazard to players. The rodenticide is considered a last resort, for use in cases where trapping is not feasible. The Generation Mini-blocks (difethialone) product is used for rats in the vicinity of structures, again only where trapping is not feasible.

R&P, along with the citywide pest control contractor, have eliminated their use of brodifacoum-based rodenticides, which had concerns over secondary toxicity. R&P also experimented with a "smoke bomb" approach for controlling ground squirrels. Ground squirrels are primarily a concern at Sharps Park, the City-owned golf course in Pacifica. The rodent burrows weaken levees and extend into the adjacent golf course. Because of heavy public use of the area, neither traps nor baits have proven effective. R&P experimented with an EPA-registered USDA Gas Cartridge, used in conjunction with a special blower to inject the gas (carbon monoxide) more effectively. The experiment was conducted near Monster Park, in an area heavily infested with ground squirrels. R&P staff concluded that the technique was effective, but that care must be taken to avoid a worker safety hazard. As a result, the product has been proposed for addition to the Reduced-Risk Pesticide list for 2007.

Herbicide Use

R&P used 179 pounds of Roundup (glyphosate) active ingredients in 2005, representing a 14% reduction since 2003 (Fig. 37). R&P has been moving away from the use of the liquid *RoundUp* products due to concerns with the inert ingredients. Additionally, the dry granular formulation is easier to pour and has less chance of spill, does not leave residue on the outside of containers, is in dry granular form and is therefore easier to clean up in the case of a spill. According to Monsanto (the product's manufacturer), the inert ingredients in the dry formulation have fewer toxicity concerns.

In 2002 the Harding Park Golf course renovation employed the use of 140 gallons of *RoundUp* herbicide to kill all the existing kikuyu grass before re-planting with more desirable grasses. The course remains free of kikuyu, with new patches being spot treated or removed by hand when detected. The course renovation project was justified and funded in part by the ability to hold PGA tournaments at the site after the renovation. This necessitates the continued maintenance of very low weed levels and high aesthetic standards. Although post-renovation kikuyu remains under control, several new weeds have invaded, including *Soliva sessilis* (field soliva) and Swine cress (*Coronopus* sp.). Much of the non-*RoundUp* herbicide use in 2004-2005 (*Vanquish*, *Turfлон ester*, and *Proturf new KOG Weed Control*) is to mediate the invasion of these weeds and satisfy the PGA tournament standards. The *Vanquish* product, with active ingredient dicamba, required special exemptions from the Dept. of the Environment. We continue to search for other viable management alternatives for these weeds

Golf Course IPM

Due to contract options signed with PGA Tours, R&P has been devoting considerable energy to addressing pest management challenges related to golf. Harding Park managers experimented with various products and rates, for example, to address the *Soliva sessilis* challenge. They conducted a large-scale weed hand-removal program to remove English daisies. They also grappled with earwig infestations of irrigation control boxes. Earwigs can be an expensive problem on golf courses when they cause short-circuits in the control boxes, and the resulting lack of water may also harm the turf. R&P tried vacuuming the boxes, applying diatomaceous earth, and applying limonene-based repellents, but none of these options was adequate. At the urging of PGA Tours, R&P staff applied for an exemption to use Delta Dust (deltamethrin) and/or ProZap Insect Guard (dichlorvos) in the boxes. The latter product was used because it comes in the form of impregnated plastic strips that can be left in the boxes, with less worker exposure than the dust option.

Jon Scott, Chief Agronomist for PGA Tours, summed up R&P IPM Coordinator Phil Rossi's work after the tournament was complete:

"I can tell you already that no course I have worked with has produced such great results and turf quality with the bare minimum [pesticide] input you have achieved at Harding Park. This is a tremendous success story..."

There is room for improvement in terms of pesticide use (for example, several observers—including Cornell Turf Specialist Frank Rossi—concluded afterward that the large application of Merit was probably unwarranted). However, SFE looks forward to working with PGA Tours and R&P to experiment with other reduced-risk approaches for future tournaments.

Pesticide use at other City golf courses has been much lower than Harding due to lower aesthetic requirements for non-tournament play. The course at Glenn Eagles is a special case; it only fell under the IPM Ordinance requirements in 2004, since its previous (private) manager had signed the lease before 1996. The new Glenn Eagles management has not filed any pesticide use reports to date. SFE are investigating whether this is an oversight or a case of very low pesticide input.

Other issues

It is important to note that the R&P has demonstrated a commitment to the IPM program that may not be wholly reflected in the data included in this report. Activities such as training for staff, pilot projects experimenting with compost tea and EM-1 products, trial use of non-toxic rodenticides, increased use of mechanical weed removal and weed tolerance at Sharp Park and Lincoln golf courses, increased use propane-powered weed torches, extensive use of mulch to prevent weeds, use of beneficial insects, and manual removal efforts for aquatic weeds all indicate R&P's willingness to seek alternatives to chemical pesticides. Use of weed barriers such as weed fabric or cardboard covered by mulch is increasing and turning many landscaped areas into low maintenance sites. R&P's use of "weed daubers" to target herbicide applications helps them reduce pesticide use and exposure while curbing the spread of invasive species. R&P has stepped up their composting program with the purchase of equipment necessary to process high quality compost. For mosquito control, R&P staff have drained several water sources, used *Bacillus thuringiensis* bacterial products to manage larval mosquitoes, and have introduced mosquito fish (*Gambusia affinis*) to contained ponds.

Department of Recreation and Parks Top 10 Pesticide Products Used in 2004/2005					
Product Name	Active Ingredient	Tier	2004	2005 full product	2005 active ingredient
Generation mini-blocks	Difethialone 0.0025%	I	113 lbs	459 lbs	0.01 lbs
Merit* 0.5G	Imidacloprid 0.5%	I	0	345 lbs	0.17 lbs
Maki mini-blocks	Bromadiolone 0.005%	I	139 lbs	261 lbs	0.01 lbs
Proturf New KOG Weed Control	Dicamba 0.7%	I	293 lbs	257 lbs	1.8 lbs
Eaton's answer for pocket gophers	Diphacinone 0.005%	II	176 lbs	12 lbs	0.0006 lbs
Roundup Pro Dry	Glyphosate 71.4%	II	156 lbs	183 lbs	131 lbs
TurfShield	<i>Trichoderma</i> strain	IV	0	120 lbs	120 lbs
Eaton's bait blocks rodenticide w/ bitrex	Diphacinone 0.005%	II	3 lbs	78 lbs	0.004 lbs
Eaton's all weather bait blocks	Diphacinone 0.005%	II	69 lbs	59 lbs	0.003 lbs
Sluggo	Iron phosphate 1%	III	25 lbs	48 lbs	0.05 lbs
Proturf Systemic Fungicide	Thiophanate-Methyl 2.3%	I	0	47 lbs	1.1 lbs

*Merit 0.5G has not yet been screened for Tier level, but is expected to score as a Tier I

Department of Recreation and Parks - Pesticide Use Graphs

Figure 33

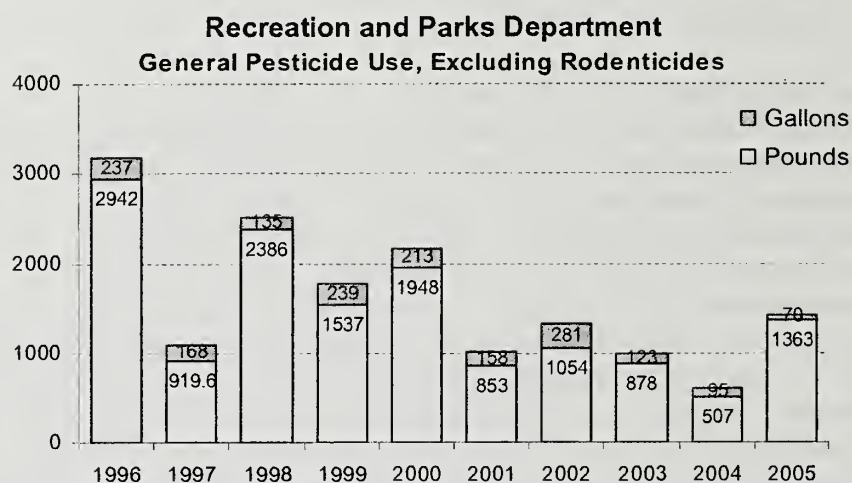


Figure 34

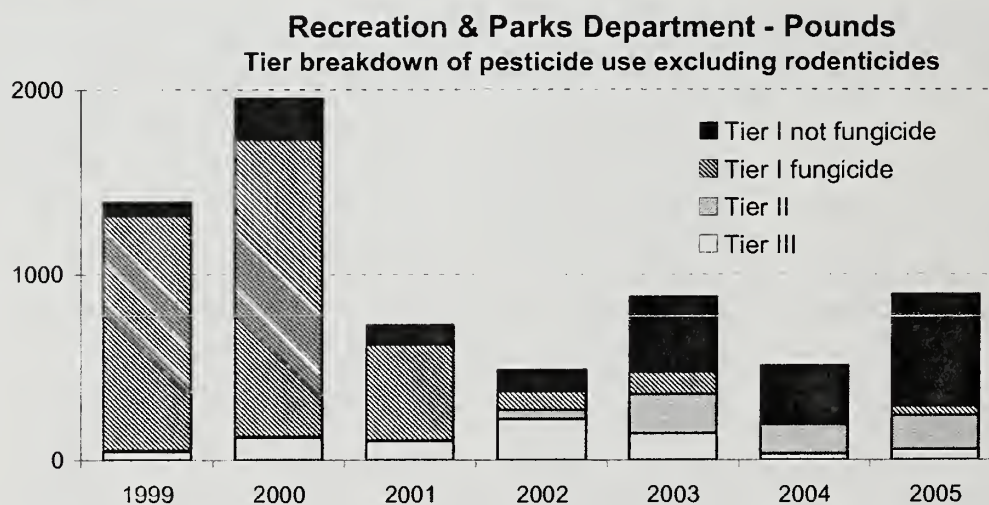


Figure 35

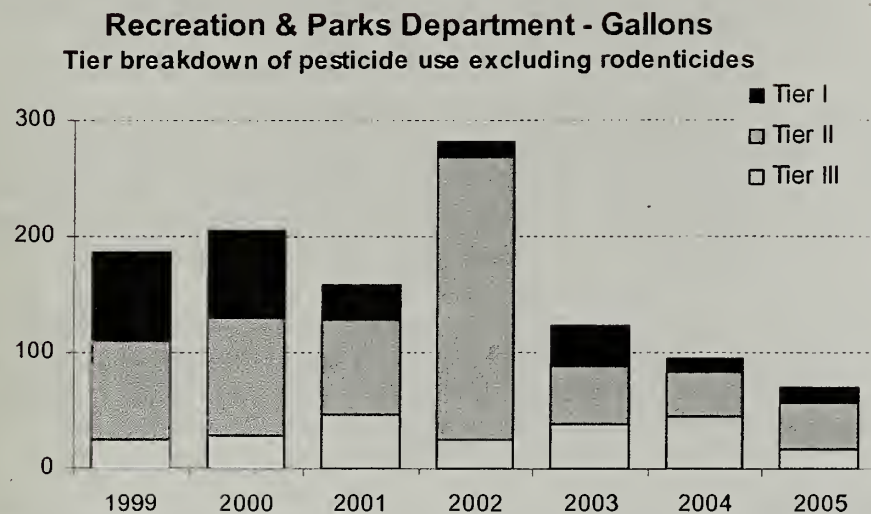


Figure 36

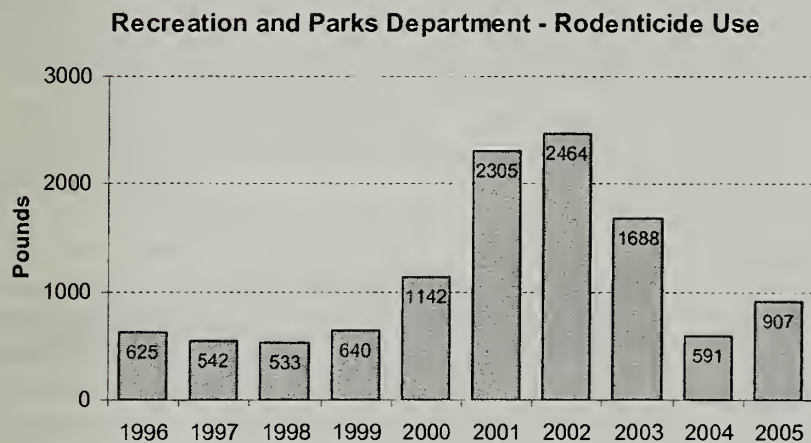
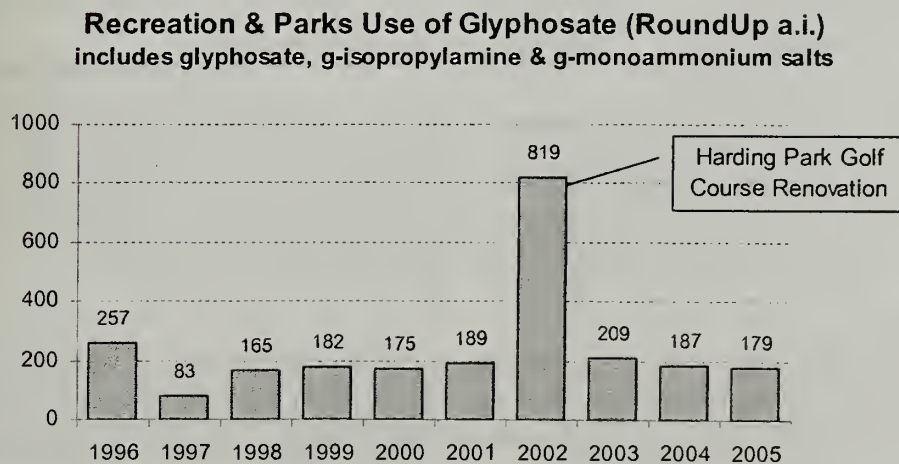


Figure 37



* pounds = gallons x 8.33 x specific gravity

San Francisco International Airport (SFIA)

SFIA is unique among City departments in that the airport leases much of its property to a wide variety of tenants, ranging from large hangars leased to major airlines to small booths rented to food vendors. SFIA maintains a contract with Applied Pest Management (APM) to perform most of its pesticide application and routine pest management services. However, the individual tenants (such as small restaurants) often maintain separate contracts with their own PCO vendors, or perform pest management activities themselves. In addition, SFIA has various agreements with other agencies, notably CalTrans, to manage pests and weeds on their properties. Finally, large parts of the airport are subject to stringent FAA regulations governing weed height, fire hazards, and bird populations. Within such a complex context, communication and coordination of pest management efforts are a challenge.

Trends in Amounts Used

SFIA has seen major expansion in landscaped areas in recent years, without corresponding increases in landscape maintenance staff. As a result, herbicide use has begun to creep upward again after early reductions. Mosquito larvicide use has increased considerably due to concerns over mosquito-vectored diseases in the extensive wetland areas surrounding the airport, and is complicated by the presence of endangered species in the marshes where the mosquitoes breed. Most of the mosquito management work at SFIA is conducted by the San Mateo Mosquito Abatement District and paid for by SFIA. Inside the facilities, coordination of multiple pest control efforts by numerous independent contractors remains a challenge, and thus far IPM is only minimally employed as far as we know.

SFIA pesticide use fell dramatically from 1996 to 2001, with a 82% reduction in total pounds used and an 88% reduction in gallons (Fig. 38). However, pesticide use is currently on the rise. In pounds, the largest share of the increase since 2001 was in Tier III (least hazard) products such as mosquito larvicides and slug bait, followed by a four-fold increase in rodenticide use. The use of glyphosate-based herbicides (such as Roundup® -

Tier II) and rodenticides (mostly Tier I) also increased during this period (see *Herbicide Use*, below). We know there is some pesticide use not being reported by SFIA at this time. The Department of the Environment is working with airport IPM staff to ensure complete reporting in the future. Therefore, some figures in this section may be slightly inaccurate. The highest-quantity pesticides reported by SFIA in 2004/2005 are listed in the table to the right.

Trends in Toxicity

Rodenticides are generally the only Tier I products used by SFIA, and their use is on the rise and is expected to increase or remain the same in the future (see *Rodenticide Use*, below) (Fig. 39,40). 4.4 lbs. of an unlisted adjuvant product called CMR Herbicide Activator was apparently

Table 8. Most used Pesticides by SFIA in 2004/2005

Product	Tier	2004	2005
Contrac All-Weather Bait Blox Rodenticide	I	15 lbs	120 lbs
Golden Bear Mosquito Larvicide GB-1111	II	45 gals	67 gals
Vectobac-G Biological mosquito larvicide	III	29 lbs	45 lbs
Roundup Pro Herbicide	II	8 gals	34 gals
Vectolex CG	III	0	20 lbs
Oust XP Herbicide by DuPont	II	0	5 lbs
CMR Herbicide Activator (not on list)	I	0	4 lbs

applied in 2005 by APM. This product is also Tier I and APM is being notified of the inappropriate applications.

Tier II product use was mainly for mosquito larval control using Golden Bear Mosquito Larvicide Oil (GB 1111), with additional Tier II use for weed control on rights-of-way primarily using Roundup Pro (Fig. 39,40). The mosquito biological larvicides Vectobac-G and Vectolex CG account for almost all of Tier III pesticide use. Note that these figures and graphs do not include special aerial applications of mosquito larvicide conducted by the San Mateo Mosquito Abatement District (SMMAD) – see the *Mosquito Control* section below.

Rodenticide Use

The airports elevated rodenticide use figures reflect redoubled efforts at rat control, exacerbated by the airport's growth (Fig. 41). The opening of new buildings at SFIA has created additional areas in which staff must implement rodent control efforts. Rodenticide use increased by 43% between 2003 and 2005. The airport mainly uses *Contrac all weather blocks* with the active ingredient bromadiolone. Although many sanitation measures have been implemented (such as ensuring that refuse containers are tightly covered and food is stored in sealed containers off the ground), the complex leasing arrangements at SFIA sometimes limit the ability of airport pest management staff to implement adequate pest prevention efforts. Problem areas include the taxi waiting area and loading docks which, despite pest managers' repeated requests for sanitation, continue to be a food source problem for rodents and birds. The best strategy SFIA has found to manage rodent populations in these areas is baiting. The use of rodenticides (Tier I) by SFIA is therefore predicted to continue.

Herbicide Use

The use of glyphosate (Roundup ®)—the most heavily used herbicide— has leveled off at SFIA and is expected to increase due to the expansion of the airport's landscaped areas, which have approximately tripled since 2000. There has not been a proportional increase in personnel available to do manual weed cutting. Additionally, a considerable portion the new acreage is along freeways, where spraying is sometimes preferable to manual cutting for worker safety reasons. SFIA staff are implementing non-pesticide weed management tactics such as weed cloth where possible, and increasing their tolerance for weeds in other areas. Other factors that inhibit SFIA's ability to reduce herbicide use further are strict FAA regulations concerning weeds on runways, including a recent requirement to have a 10-foot perimeter cleared around all signs. Also, mowing is impossible in some of the below-sea-level areas of the airport due to muddy conditions before April or May.

Mosquito Control

The use of mosquito larvicides is on the rise due to recent concerns over West Nile Virus (Fig. 43). Airport staff have made preventative larvicides applications to the surrounding wetland and marsh areas in an attempt to avoid the need for aerial adulticides. The emphasis on West Nile virus containment in light of the important role played by airports in the spread of mosquito-vectored diseases accounts for the increase from almost

Table 9. Mosquito Larvicides Applied to SFIA Property by SMCMAAD

	2004	2005
SF International Airport		
Vectolex CG (<i>Bacillus</i> sp)	880 lbs	1440 lbs
Altosid XRG 1.5% (methoprene)	20 lbs	1520 lbs
Golden Bear Oil 1111	25 gals	103 gals
Vectobac 12AS (<i>Bacillus</i> sp)	3.7 gals	40 gals
Altosid briquettes (methoprene)	0	13 briquettes
Altosid XR briquettes (methoprene)	0	8 ozs (4 briq)
Altosid pellets (methoprene)	0.3 lbs	2 lbs
Altosid liquid larvicide, 20%	0	1 gal
Altosid liquid larvicide, 5%	1 gal	1 gal
Teknar HPD (<i>Bacillus</i> sp)	3 gals	0

none in 2002 to 65 lbs and 67 gallons applied by airport staff in 2005. In addition to the products applied by SFIA staff, SFIA maintains an agreement with the San Mateo County Mosquito Abatement District (SMCMAD) to treat parts of its marshland by helicopter. SMCMAD applications on SFIA property in 2004 and 2005 can be seen in Table 9 to the right and are not included in the other graphs and figures reporting SFIA pesticide use.

Much of these treatments involved Vectobac-G and Vectolex CG, both Tier III products with the bacteria *Bacillus thuringiensus* as the active ingredient. Altosid pellets (Tier II, active ingredient methoprene) also accounted for a large portion of the treatments. All of the liquid formulations were with Golden Bear Oil (GB 1111, Tier II), an oil that forms an ultrathin layer on the water's surface to smother larvae. Some SFIA marshlands are home to the endangered San Francisco garter snake, and therefore require special precautions by land managers.

San Francisco International Airport - Pesticide Use Graphs

Figure 38.

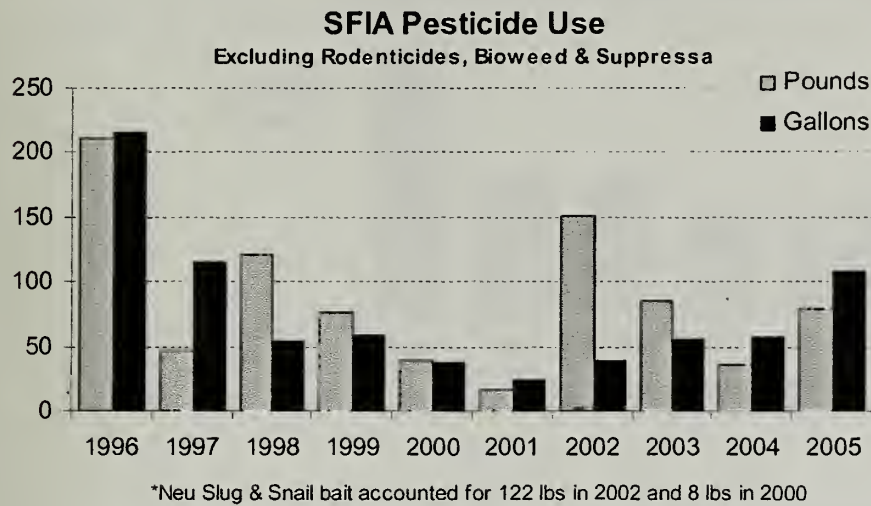


Figure 39.

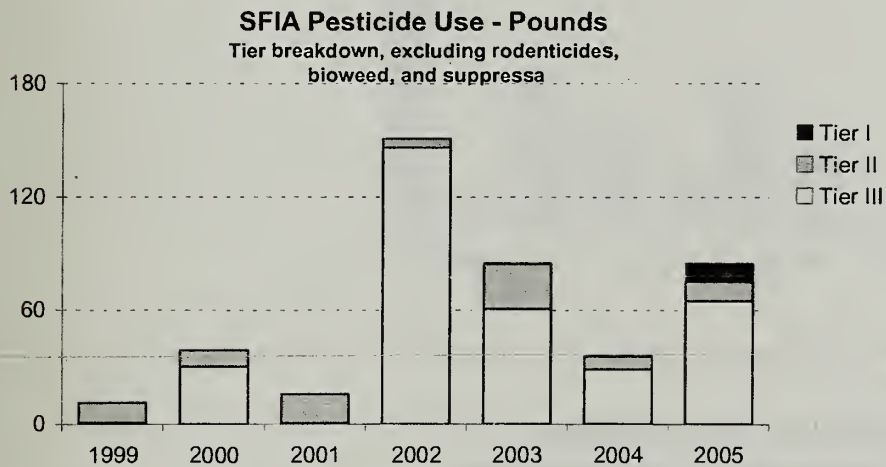


Figure 40.

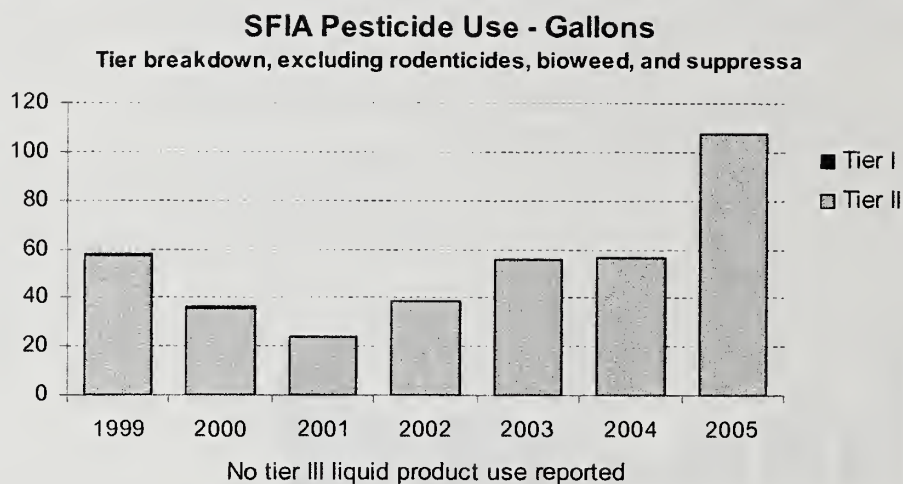


Figure 41.

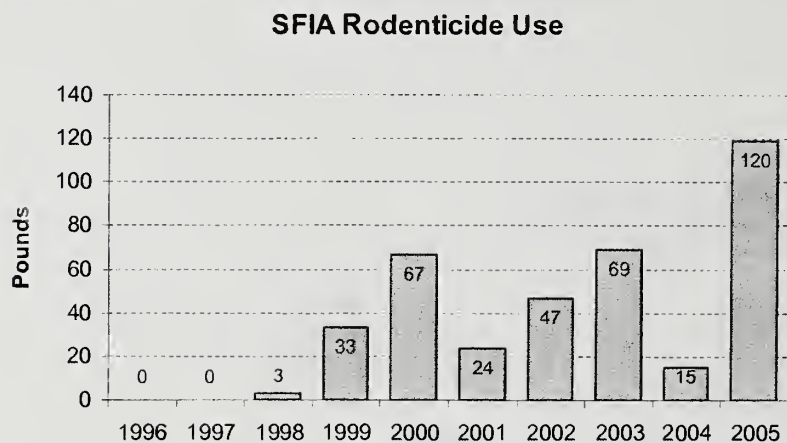


Figure 42.

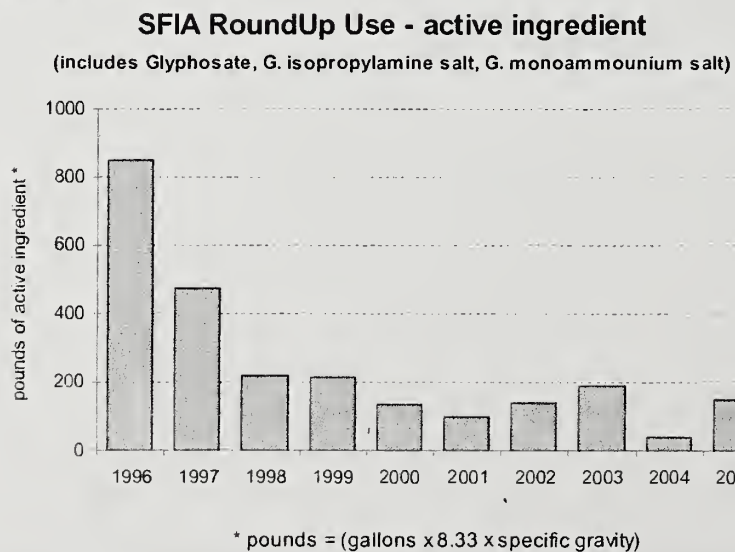


Figure 43.

